40 Rock. ©

POPULAR Computing WEEKLY

FREE GAMES CASSETTES

35p 13-19 October 1983 Vol 2 No 41

This Week

News Desk

Oric joins up with Edenspring

ORIC Products International is to be become part of Edenspring Investments, the property and travel investment group

The takeover by Edenspring gives Oric the additional finance needed to fund expansion

Said Oric's chairman John Tullis, "Because we are increasing our trade so rapidly and going into a number of new products in 1984 we have had to widen our capital base to finance the developments — we would not have been able to fund that ourselves."

John would not be drawn on the details of the new products "We have new computers and peripherals and we also have products which are not in the computer field, particularly in the area of electronic optics

"I intend to widen the company's product base and it is hoped that within two years computers and peripherals will

Continued on page 5

Aquarius dropped but reappears

MATTEL is to drop the Aquarius computer

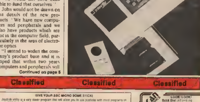
But it will not disappear Instead, it will be taken over by its present manufacturer, Radofin At the same time the price of the machine — still to be called the Aquarius — will drop to £59 95 possibly to be discounted by retailers down to £49 95

Confirming the changes, Radofin's managing director, Alan Leboff said "The deal we have done with Mattel means that they will bring the price down to this level and then, at some point, we will take over supplying dealers directly, rather than as at present where we supply Mattel who in turn supply the retailers

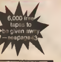
"We hope the price drop will have a dramatic effect on sales," he added

Mattel's wish to ease itself out of its Aquarius commit

Continued on page 5



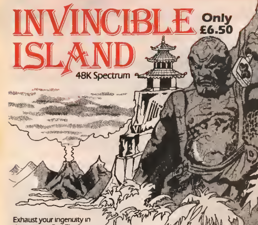
Classified



Continued on page 48

★ ★ BRITAIN'S HOME COMPUTER WEEKLY ★ ★

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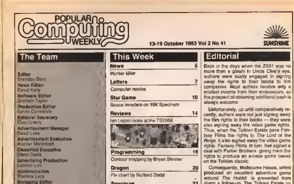
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Popular Computing Weekly
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This Week

Editorial

Back in the days when the ZX81 was no more than a gleam in Uncle Clive's eye, authors were busily engaged in signing away the rights to their books to film companies. Most authors receive only a modest income from their endeavours, so the prospect of obtaining additional cash is always welcome.

Unfortunately, up until comparatively recently, authors were not just signing away the film rights to their books — they were also signing away the video game rights. Thus, when the Tolkien Estate gave Fantasy Films the rights to *The Lord of the Rings*, it also signed away the video game rights. Fantasy Films in turn has signed a deal with Parker Brothers, giving them the rights to produce an arcade game based on the Tolkien classic.

Consequently, Melbourne House, which produced an excellent adventure game around *The Hobbit*, is prevented from doing a follow-up. The Tolkien Estate no longer has the rights to *The Lord of the Rings* and Parker Brothers are not interested in giving Melbourne House any subsidiary rights.

However, it would be possible for Melbourne House to make a *Hobbit 2*, based on characters and situations from *The Hobbit* rather than *The Lord of the Rings*, if the Tolkien Estate was agreeable. But, despite the success of *The Hobbit*, the Tolkien Estate has decided against a *Hobbit 2*.

Unless the Tolkien Estate changes its mind, *The Hobbit* saga has come to an end.

Next Thursday

Just like Icarus, if you fly too close to the sun your feathers will come unstuck. Stick them back on to avoid falling to the ground, and gain points. Icarus, next week's star game fro the unexpanded Vic20 by H Rivera.

Aquarius

Continued from page 1

ments would appear to be a result of the heavy financial losses incurred by the US parent company Mattel will continue to support its toy business and Intellivision console

In an increasingly competitive market, Mattel being neither a computer designer nor manufacturer, would appear to have been squeezed out

Radofin on the other hand, being both the designer and far eastern manufacturer of the Aquarius (and the Intellivision), seems better placed to be competitive — as indicated by the swingeing price cut which it has now imposed, effective within the next few weeks

By Christmas, it is hoped that Radofin will be the sole supplier of Aquarius computers Other prices are also to come down — the games cartridges (now licenced from Mattel) will come down to £12 95, home business packs will fall by about £30 to £28 95 and the data recorder comes down £10 to £39 95

At the same time, Radofin is developing a range of cassette software for the Aquarius and a light-pen will be launched in late November

Mattel's urgent wish to withdraw from the very competitive home computer market has been prompted by losses for the whole group of $156 1m for the quarter to July 1 For the same period, Mattel's computer and video game division lost $166 7m

Oric

Continued from page 1

form no more than 50 percent of our business "

Under the deal with Edenspring, Oric will — through a shares issue — gain an initial 18 per cent shareholding in the combined group If, in the two-year period from June 30 1983, Oric turns in a pre-tax profit of more than £2m then, through a further shares issue, Oric will increase its holding in Edenspring to 44.2 per cent

Shares in Edenspring — suspended at 9p on October 4 — value the Oric takeover at just over £1m

Additional share issues by Edenspring will satisfy Oric's present outstanding loans of just over £1m and provide a further £750 000

Another advantage of the takeover for Oric is that, although Edenspring will lose its full stock market quotation in the deal, shares will be available on an over-the-counter basis

John Tullis

John Tullis and Barry Muncaster will both join the board of Edenspring on the completion of the acquisition

Edenspring Investments came into being earlier this year, rescued from Pennine Commercial Holdings which ran into financial difficulties

Microcare supports Flex system

MICROCARE's decision, announced last week, to support the Flex disc operating system on the Dragon is a direct challenge to Dragon which has chosen to support the OS9 disc system (see *Popular Computing Weekly* October 6)

"We have negotiated with Technical Systems Consultants for the rights to the Flex operating system for the Dragon," said Microcare's Eric Brook

Any disc operating system — once tailored to a particular machine — allows standard software packages written for the system to be run

Says Eric "Flex is much better than OS9, because it has been around much longer and there is more software written for it.

"OS9 has about five year's catching up to do on Flex — OS9 is more complicated than Flex and therefore more difficult to use and Flex is also cheaper

To begin with, Microcare will offer the following range of software Languages TSC *Compiled Basic* TSC *Compiled Pascal*, Dynasoft *Tiny Pascal*, TSC *Basic Precompiler*, Compusense *Cobol*, M&J *Forth*, Windrush *PL9* Utilities *Super Sleuth* processor disassembler, Windrush *Mace* TSC *De-bug* OS9 simulator cross assembler Applications TSC text processor, *Dynastar II* word processor, *Dynaform*, *Dynaspell*, UDRI *Inventory*, UDRI *Database Management System*, UDRI *Accounts*, UDRI *Ledger* *RMS* record management system, TSC *Sort/Merge*

Flex will cost £65 or £90 with an editor/assembler It will be configured for the Premier Delta disc system, but a version to run on Dragon's own disc system will follow

Neither Flex nor OS9 will run on a 32K Dragon, but Microcare is offering to upgrade a Dragon 32 to 64K Dragon has apparently issued seven different circuit boards for the Dragon 32, and the price of the upgrade depends on the board

Flex from Microcare will be ready at the beginning of November — at the same time as Dragon's 64K machine, but some weeks before Dragon launches its OS9 Details from Microcare, 1 Oakwood Road, Rode Heath Stoke-on-Trent

No escape from Maggie

NOVEMBER 5 would seem an appropriate enough date to launch an adventure game which "gently knocks the political establishment"

Roger Taylor, author of *Denis Through the Drinking Glass*, explains that his text-only adventure program puts you in the role of Denis, trying to escape the Iron Lady

The program understands about 300 words, and each of the 80 locations in the adventure is introduced with a small verse which Roger freely admits is pretty appalling

The program is for the 48K Spectrum and will cost £5 50, available from Applications, 8 St Paul's Road, Peterborough

Official US launch

ACORN officially launched its BBC computer in the US last week As in the UK, the machine will initially be promoted for use in education

The BBC B will sell for $995 and Acorn is already claiming advance orders for 12,000 units worth $21m

Acorn's US subsidiary has so far signed agreements with 14 major American software publishers to develop material for the computer

Stalked and torpedoed by Interface

HUNTER KILLER is the first two-player interactive game to take advantage of the networking facility now offered by the Spectrum

Edinburgh-based Protek began development of the game well before the ZX Interface 1 was announced — intending to sell its own simple networking device for two 48K Spectrums Now the game has been adapted to work with the Sinclair unit

Set in the North Sea during the Second World War, the game is an elaborate simulation of submarine warfare

Each player, using a 48K Spectrum, must try to stalk and torpedo the other An accompanying 12-page booklet explains control of the submarines — steering, diving diesel and electric propulsion, navigation and using the periscope, torpedoes, radar asdic warning and depth sounder

Protek's Gordon Hewitt explained "For the first time, using the networking, you are not tracking a tame target Instead it is very much alive and each player must play a game of cat-and-mouse "

During the play the positions, speeds and headings of both submarines are constantly exchanged between the players, using the networking on Interface 1

Hunter Killer, written by Rod Hopkins, will be available before the end of October The price of £7 95 includes both the one and two-player versions of the game

A wee beastie

I write more in sorrow than in anger — to remind you of the many people who have remained faithful to our ZX81s that versatile little black box I value your magazine highly but haven't seen even a mention of my wee beastie for weeks

Take no notice of these Johnny come lately Spectrum owners and their cries for machine code articles Devote a corner instead, to the sinewy little Sinclair and win our undying gratitude

John Booker
26 Moorside Road
Stockport
Cheshire SK4 4DT

Don't worry, we haven't forgotten the ZX81, though it has been a little neglected of late. The micro that launched a million users is very much alive

Domestic hint

No doubt thousands of people like myself are fighting a battle with their *Vic20 Programmer's Reference Guide* The problem is that the pages seem to stick on the plastic spine They tear and make the book unpleasant to use (the pages won't lay flat)

However the problem is easily solved Spray the spine with furniture polish The pages turn more easily, making the book much more manageable

Dave Stamp
22 Fir Rigg Drive
Marske
Redcar
Cleveland TS11 6BT

An easy solution

With reference to Sinclair Spectrum series 3 problems with *In* command (*PCW* 15-21 September), I have an easy solution provided that the program is written in Basic (machine code programs of a commercial origin are generally not alterable by your readers)

For example *10 Print In 57342 Goto 10* will give the result 255 with issue 1 and 2 machines — and 191 with issue 3 machines

At each occasion that an *In* command is needed a preceding *Out* command will reset the lists set by the ULA For example *10 Out 57342,255 Print In 57342 Goto 10* will now give the result with both issue 1, 2 and 3 machines

So, the solution to Basic programming is quite simple — proceed an *In* command with an *Out 255* command and any Basic program will work on any Spectrum issue 1, 2 or 3

W Smith
25 Swallowfield Road
Sedgley
Dudley
West Midlands
DY3 3TR

What is time?

I have just had the oddest phone conversation with a Sinclair Research lady It went like this

Me — I ordered a Microdrive a little over a month ago and I haven't received it yet

Her — It does take 28 days to deliver

Me — But it's more than 28 days since I ordered it

Her — It takes 28 working days to deliver

Me — What's the difference between 28 working days and 28 days on the calender?

Her — I don't know

Me — I ordered a Microdrive a little over a month ago and I haven't received it yet

Her — Did you send the order form by Freepost?

Me — Yes

Her — Ah, well, it takes two weeks before we get the Freepost mail and it is 28 days after that that you will get your Microdrive

Me — So the ads that say allow 28 days should say allow 28 days and two weeks?

Her — Yes

Me — So the ads are being a bit naughty saying 28 days?

Her — Yes

Me — But it was only a week after I ordered it that I got an acknowledgement of order

Her — Ah well you should get your Microdrive next week

What is time?

Chris Timson
47B Goldsmith Avenue
London E12

Which Computer

I bought your magazine this week in an effort to try to understand the world of home computers with a view to purchasing one for my 11 year-old daughter for Christmas In view of the financial outlay involved, I want to purchase one which will not be too restrictive and which I would be able to use too

Your magazine gave me a lot of jargon, programs and I'm sure when I purchase a computer will give me a lot of help But, unfortunately I still don't know which computer to buy Could you therefore help a future (I'm sure *avid*) reader, and give some advice on what computer to buy

My daughter uses a BBC model B at school, but I couldn't afford one of those She has her own 12in portable black and white tv, which I presume could be used as a screen I have been told by various computer 'buffs' to get at least a 16K micro, to enable it to be used for other things apart from games, as my daughter and, I hope, I become more proficient

To further complicate matters, my firm (where I am employed) is to purchase a package including ICL DRS 20 model 10 computers, which I am expected to learn to use and to program in Basic as part of my job as an office administrator So naturally, I would like to buy a home computer which would be similar in the language used although I realise that I couldn't expect a direct comparison

I realise I may have asked the impossible, but I fear I may become the prey of a clever salesman if I venture into a computer shop to get this advice I could pay no more than £150 for a complete package but if I were to choose the wrong thing I could ill afford to waste this amount I look forward to hearing from you in this matter and, as an aside, would add that even for a complete novice your magazine is interesting and informative, even if at this stage, it does only serve to show just how much there is to know and how little I know about where to start!

S Roe
26a Melrose Avenue
Yate
Bristol
BS17 5AL

This is one of the commonest questions we are asked, but it is also one of the most difficult to answer. The choice of computer depends on how much you have to spend and what facilities you want.

With an upper limit of £150 you are automatically excluding the Acorn Electron, the Commodore 64 and Dragon 32 as well as the BBC machine This leaves you with the Sinclair ZX81 and Spectrum, 16K Oric and Commodore Vic20 to name but a few Each machine has its own advantages and disadvantages. You would be well-advised to try and get some 'hands-on' experience, either at a computer store or a local user club, before making a final decision.

New improved version?

Further to the somewhat governessy letter from Sinclair Research, published in your current issue (*PCW* October 6-12), if "In accordance with our policy of constantly improving our products, we have from time to time made changes to the Spectrum" what about

(1) The faulty bit at *006D* of the Rom which prevents the use of the non-maskable interrupt?

(2) the dog-end of ZX81 code which got left in between *04AA* and *04C1*?

(3) The 913 empty bytes between *386E* and *3CFF*?

Why not put something useful into the last two like a line renumbering routine?

Perhaps these have been put right in the series 3, I don't know Luckily I still have a series 2 — which also puts the picture in the centre of the tv screen, unlike the new improved version

John Durst
Coltscombe Barn
Swerford
Oxon OX7 4AS


Write your own machine code adventures
Without any knowledge of machine code whatsoever
THE QUILL
THE QUILL is a major new utility written in machine code which allows even the novice programmer to produce high-speed machine code adventures of superior quality to many available at the moment without any knowledge of machine code whatsoever
Using a menu selection system you may create well over 200 locations, describe them and connect routes between them. You may then fill them with objects and problems of your choice. Having tested your adventure you may alter and experiment with any section with the greatest of ease. A part formed adventure may be saved to tape for later completion. When you have done so THE QUILL will allow you to produce a copy of your adventure which will run independently of the main QUILL editor, so that you may give copies away to your friends.
THE QUILL is provided with a detailed tutorial manual which covers every aspect of its use in writing adventures. It is impossible to describe all the features of this amazing program in such a small space so we have produced a demonstration cassette which gives further information and an example of its use
This demo-cassette is available at £2.00 and THE QUILL itself at £14.95.
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VIC 20 and CBM 64 are reg'd trade marks Commodore Business Machines
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•CBM 64 4 SLOT SWITCHABLE MOTHERBOARD — £29.95
•VIC 20 16K STANDARD RAM PACK — £28.95
•VIC 20 16K SWITCHABLE RAM PACK — £35.95
•VIC 20 32K SWITCHABLE RAM PACK — £49.95
Please allow up to 21 days for delivery
All prices include V A T, postage and packing
If you wish to be added to our mailing list please tick the appropriate box
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CMB 64
BBC
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PLEASE SEND ME
Qty
16K Std Ram Pack
16K Switchable Ram Pack
32K Switchable Ram Pack
VIC 20 4 Slot Motherboard
CBM 64 4 Slot Motherboard
Name
Address
I enclose Cheque/PO for £
Home Computer Centre

Space Invaders

A new game for 16K Spectrum by Gordon Cooper

This game is great fun to play. It gives invaders which move side to side and come down to get you. You have a single laser cannon to shoot them. As they come lower, their colour becomes darker and more menacing. Let one land and that's the end of that run.

If you blast all the invaders in the first wave, you get a single shot at the mother ship for extra points. Once the ship has passed, prepare for the next wave which comes at even greater speed.

Play against your friend. Your score is shown, together with the highest score so far, at the top of the screen.

The program is written almost entirely in Basic, and uses several tricks to keep its speed up. If you find it too fast, slow it down by adding the *Beep* command. For example, change statement 40 to *Beep 05 -10 Return*.

The key to the program lies in the subroutine at statements 20, 30 and 40. This is dynamically modified whilst the program is running by statements 2060 and 2070, which blank out hit invaders, and statements 5370 to 5390, which restore the invaders back into the print statements 20 and 30 just before each new wave.

This key subroutine has been placed at the beginning of the program for two reasons. Firstly, it runs faster. Every subroutine call causes the computer to scan from the beginning of the program, looking for the correct line number. If it's found quickly at the beginning of the program storage, the whole game plays faster. The second benefit is that the program may be modified without moving the storage address of the subroutine. This is vital if the *Poke* statements are to work correctly.

The *Poke* statements work by using the variable *p* to point to the first print character position in statement 20. This is set up by statement 5310. This works by *Peeking* the Spectrum's system variables to find the program start, and then adding 68.

Sixty eight is the number of bytes occupied by statements 20 and the beginning of 30. For this to hold true, you must enter statements 20 and 30 *exactly* as shown. Note that the Rem in statement 20 has seven blanks between past and invader to make the printout easier to read. An alternative is to remove the Rem from statement 20 and change statement 5310 to add only 30 to the *Peeked* value.

The remainder of the program is slightly easier to understand. When initially run, control goes straight to statements 4000 and following. These set up five special characters. You should be able to see their outline in the binary pattern. It's a good idea to enter these first, and run that part of the program to define your characters. Once run, you can enter the remainder of the program, the special characters being entered using graphics mode, and *a, b, c, d*, or *e*.

When the program is running, the next function it performs is to set up a flashing



logo by calling subroutine 9000 This may seem to use rather complex graphics, but gives an amazing display of two flashing coloured invaders To make it easier to enter you will find that each print statement is repeated Thus you may enter each block of graphics once, then edit the line number and print at position to produce the next statement.

While the logo remains flashing the program then interrogates for name of player offers instructions and initialises variables During this set up, statements 5412 to 5419 are skipped over as *m* has been set to 0 This prevents the mother ship being plotted until after the first wave of invaders has been anihilated Statement 6000 passes control to 375, which calls the subroutine to start the invaders descending

If the fire button, or the *0* key, have been depressed, statement 360 passes control to 400 the beginning of the laser gun firing routine A hit is detected by statements 400 and 415 If no hit occurs, control goes from 490 to 310 to continue the invaders descending

If the gunfire hits an invader control goes to statement 2000 Statement 2010 flashes an exploding invader, while 2016 gives sound effects Line 2020 updates the score, dependant upon the height of the invader Lines 2060 and 2070 blank out the invader from the relevant print statement 20 or 30 Line 2080 checks to see whether all the invaders have been hit and, if not loops back to the invader descent routine If all invaders have been hit, control goes to 5410 after setting the flag *m* to 1

Statement 5410 was used during the initialisation, but this time has the flag *m* set This causes statements 5412 to 5418 to fly a mother ship across the screen Statement 5415 checks for the fire button When firing at the mother ship, the fire subroutine at 400 and the hit routine at 2000 are used as for the earlier invaders These routines run as inline code when the invaders are descending to speed their execution At this later phase of the game they are used as subroutines, by the *m* flag bringing in *Return* instructions at 485, and 2050

Once the mother ship has passed control goes via 5416 to 5350, which initialises for another invader wave as at the beginning However this time statement 5440 has added another 05 to variable *n* causing the invaders to come down faster Eventually an invader hits the base line detected by statement 390 and control goes to 8000 This flashes the logo as at the beginning updates the high score if appropriate and restarts the game

Before you run the program it is a good idea to *Save* it at least once onto tape as any mistake in the *Poke* statements can destroy your precious program You can test the *Poke* statements as follows Run the program, and start the invaders descending Don't fire at any of them Press *Break* to stop them, then enter as a direct command *Poke p + 11 143* Now list the program You should find the third invader of statement 30 changed to a black square If the black square is elsewhere, correct statements 10,20 or 5310 until the above test is correct You're now ready to play Good shooting ■

```
 10 GO TO 4000  REM Skip past
    invader plot routine
 20 PRINT INK i,AT e,f," A    A
  A    A    A    A"
 30 IF c THEN PRINT INK j,AT e+
3,f," A    A    A    A    A    A
"
 40 RETURN
300 REM Gun mover
310 PRINT AT 21,a," "
320 IF INKEY$="8" AND a<31 THEN
LET a=a+1
330 IF INKEY$="5" AND a THEN LE
T a=a-1
340 PRINT AT 21,a,"B"
350 IF INKEY$="0" THEN LET g=1
REM Gun firing
360 IF g THEN GO TO 400
365 IF f=0 THEN LET d=1  BEEP .
02,-10
370 IF f=5 THEN LET d=-1  BEEP
.02,-3
375 OVER 1  GO SUB 20  REM Rubo
ut
380 LET f=f+d
382 LET e=e+n
385 OVER 0  GO SUB 20  REM New
print
386 IF e>=3 THEN LET i=6  LET j
=3  REM 1st.colour change
387 IF e>=6 THEN LET i=3  LET j
=1
388 IF e>=9 THEN LET i=1  LET j
=0
389 IF e>=12 THEN LET i=j
390 IF e>21 OR e>18 AND c THEN
GO TO 8000  REM Hit bottom
395 GO TO 310  REM Loop back to
gun move routine
400 IF SCREEN$ (20,a)<>" " THEN
 LET b=20  GO TO 2010  REM Inv
immediately in front of gun,skip
fire routine following
402 PRINT AT 20,a,"I"
405 BEEP .01,10
410 FOR b=19 TO 1 STEP -1
415 IF SCREEN$ (b,a)<>" " THEN
GO TO 2000  REM Invader hit
420 OVER 1  PRINT AT b+1,a,"I"
PRINT AT b,a,"I"
430 NEXT b
440 OVER 0
450 BEEP .01,20
455 LET g=0
460 LET s=s-1
470 PRINT AT 0,26,"     "  PRINT
 AT 0,27,s  REM Update score
480 PRINT AT 1,a," "
485 IF m THEN LET g=2  RETURN
 REM Goes to 5416 to allow only
one shot at mother ship
490 GO TO 310  REM Loop back to
gun mover
1990 REM Invader hit routine
2000 OVER 0  PRINT AT b+1,a," "
2010 PRINT FLASH 1,AT b,a,"A"
2012 IF m THEN FOR g=10 TO 30
2014 IF NOT m THEN FOR g=10 TO 3
0 STEP 3
2016 BEEP .02,g  NEXT g
2020 LET s=s+21-b  REM Increase
score dependant upon height
2030 PRINT AT 0,26,"     "  PRINT
 AT 0,27,s  REM Print new score
2035 LET g=0  REM Reset gun flag
2040 PRINT FLASH 0,AT b,a," "
2050 IF m THEN LET g=2  RETURN
 REM Returns to 5416 to allow
only one shot at ship
2060 IF b-e<=2 THEN POKE p+a-f,3
2  LET u=u-1  REM Blank out  inv
ader if on upper row
2070 IF b-e>=2 THEN POKE 54+p+a-
f,32  LET c=c-1  REM Blank out
invader if on lower row
2080 IF NOT c AND NOT u THEN LET
 m=1  GO TO 5410  REM All invs.h
it
2220 GO TO 365  REM Loop back to
inv.shifter
4000 REM Sound gen machine code
4005 RESTORE
4010 FOR a=32640 TO 32659
4020 READ n  POKE a,n
4030 NEXT a
4040 DATA 33,33,3,17,1,0,229,205
,181,3,225,43,43,43,43,43,43,16,
240,201
4990 REM 5 special chars.
5000 POKE USR "a"+0,BIN 00111100
5010 POKE USR "a"+1,BIN 01111110
5020 POKE USR "a"+2,BIN 10011001
5025 POKE USR "a"+3,BIN 10011001
5030 POKE USR "a"+4,255
5035 POKE USR "a"+5,BIN 01100110
5040 POKE USR "a"+6,BIN 11000011
5050 POKE USR "a"+7,BIN 11000011
5060 POKE USR "b"+0,BIN 01100110
5070 POKE USR "b"+1,BIN 01100110
5080 POKE USR "b"+2,BIN 01100110
```

Continued on page 13

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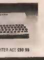

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```
5090 POKE USR "b"+3,BIN 01100110
5100 POKE USR "b"+4,255
5110 POKE USR "b"+5,255
5120 POKE USR "b"+6,255
5130 POKE USR "b"+7,255
5140 POKE USR "c"+0,BIN 01000000
5150 POKE USR "c"+1,BIN 11100000
5160 POKE USR "c"+2,BIN 01000100
5170 POKE USR "c"+3,BIN 01001110
5180 POKE USR "c"+4,BIN 11100100
5190 POKE USR "c"+5,BIN 11100100
5200 POKE USR "c"+6,BIN 00001110
5202 POKE USR "c"+7,BIN 00001110
5204 POKE USR "d"+1,BIN 00000111
5206 POKE USR "d"+2,BIN 00011111
5208 POKE USR "d"+3,BIN 01100110
5210 POKE USR "d"+4,255
5212 POKE USR "d"+5,BIN 00111111
5214 POKE USR "d"+6,BIN 00001111
5215 POKE USR "e"+1,BIN 11100000
5216 POKE USR "e"+2,BIN 11111000
5218 POKE USR "e"+3,BIN 01100110
5220 POKE USR "e"+4,255
5222 POKE USR "e"+5,BIN 11111100
5224 POKE USR "e"+6,BIN 11110000
5226 GO SUB 9000: REM Logo print
5228 OVER 0: BORDER 1: PAPER 1: INK 7
5230 PRINT AT 0,12,"INVADERS"
5232 PRINT AT 20,0,"Hello, whats your name?"
5234 RANDOMIZE USR 32640
5236 IF INKEY$<>"" THEN GO TO 5240
5238 GO TO 5234
5240 INPUT n$
5250 PRINT AT 20,0,"Hello ",n$,", need instructions?"
5260 INPUT "(y/n)",a$
5270 IF a$<>"y" AND a$<>"Y" AND a$<>"yes" THEN BEEP .5,30: GO TO 5305
5280 PRINT AT 16,0,"OK ",n$," we're after you!"
5285 PRINT AT 18,0,"Press 5/8 to move gun left/right"
5290 PRINT AT 20,0,"Press 0 to fire the gun   "
5292 INPUT "Press enter for scoring details",a$
5294 PRINT AT 15,0,"Each time you fire gun the score  "
5295 PRINT AT 17,0,"is reduced by one. Invaders hit "
5297 PRINT AT 19,0,"Score more points near top. Only"
5298 PRINT AT 21,0,"1 shot is allowed at mother ship"
5299 INPUT "Press enter to start",a$
5300 REM Init for new game
5305 LET a=15: LET g=0: LET h=0: LET m=0: LET n=.05: LET s=0
5310 LET p=256*(PEEK 23636)+PEEK (23635)+58: REM point to 1st.print posn.of stmt.20
5320 LET h$=""
5350 REM Init for next invader
5360 BORDER 1: PAPER 5: INK 0
5370 FOR i=1 TO 26 STEP 5
5380 POKE p+i,144: NEXT i: REM Reset statement 20
5390 FOR i=1 TO 26 STEP 6
5400 POKE p+54+i,144: NEXT i: REM Reset statement 30
5405 CLS
5410 LET c=6: LET d=1: LET e=1: LET f=0: LET i=7: LET j=6: LET u=6
5411 IF NOT m THEN GO TO 5420: REM Skip over mother ship plotter
5412 FOR m=0 TO 29
5413 PRINT INK 2,AT 4,m," "
5415 IF INKEY$="0" THEN LET g=g+1
5416 IF g=1 THEN GO SUB 402
5417 NEXT m
5418 LET m=0: LET g=0: REM Reset firing flags for next wave
5419 GO TO 5350
5420 PRINT AT 0,1,"High    Score ",h
5425 PRINT AT 0,1,h$: REM Name of leader over word "High"
5430 PRINT AT 0,20,"Score ",s
5440 LET n=n+.05: REM Increase inv.drop speed each wave
6000 GO TO 375
8000 REM Been got
8010 GO SUB 9000: REM Logo print
8020 PAPER 1: INK 7
8030 PRINT AT 0,12,"GOT YOU!"
8040 PRINT AT 10,0,"Well done ",n$,",you scored ",s
8050 LET i=0
8060 IF s>=h THEN PRINT AT 20,0,"Thats the highest so far!": LET i=1
8070 IF i THEN FOR i=1 TO 5: FOR j=10 TO 30 STEP 3: BORDER i: BEEP .05,j: NEXT j: NEXT i: REM Victory roll
8075 IF NOT i THEN BEEP 1,-10: REM Fail
8080 IF i THEN LET h=s: LET h$=n$
8085 PRINT AT 20,0,"Who's playing this time?    "
8090 BORDER 1: PRINT "Just press enter if same player"
8095 RANDOMIZE USR 32640
8097 IF INKEY$<>"" THEN GO TO 8100
8098 GO TO 8095
8100 INPUT a$
8105 IF a$<>"" THEN LET n$=a$
8110 PRINT AT 20,0,"Starting again in a 2 secs.        "
8120 BEEP 2,30: LET n=.05: REM Reset speed
8130 LET s=0: LET a=15
8140 GO TO 5350
8990 REM Flashing logo printer
9000 BORDER 1: PAPER 2: CLS
9005 PRINT PAPER 1,"
                                "
9010 FLASH 1: INK 1: PAPER 5
9020 PRINT AT 5,5,"
9025 PRINT AT 5,23,"
9030 PRINT AT 6,4,"
9035 PRINT AT 6,22,"
9040 PRINT AT 7,3,"
9045 PRINT AT 7,21,"
9050 PRINT AT 8,2,"
9055 PRINT AT 8,20,"
9060 PRINT AT 9,2,"
9065 PRINT AT 9,20,"
9070 PRINT AT 10,5,"
9075 PRINT AT 10,23,"
9080 PRINT AT 11,4,"
9085 PRINT AT 11,22,"
9090 PRINT AT 12,3,"
9095 PRINT AT 12,21,"              "
9110 FLASH 0
9120 FOR f=16 TO 21
9130 PRINT PAPER 1; INK 1,AT f,0;"                                "
9140 NEXT f
9150 RETURN
9500 REM          Variables
     a           Left to right of gun
     b           Laser bolt vert posn
     c           Lower row inv count
     d           +1 or -1 inv go R/L
     e           Invader drop
     f           L/R invader wobble
     g           Flag for laser fire
     h           Highest score
     i/j         Ink for invaders
     m           Flag for mother ship
     n           Vert increment
     p           1st inv.char.stmt 20
     s           Current score
     u           Upper row inv count
     ©           G.Cooper 1982
```

Timex v Spectrum

***Ian Logan** looks at the US answer to the Spectrum – the Timex-Sinclair 2068*

At last, eighteen months after the launch of the Spectrum in the UK, the Timex Corporation of Waterbury, Connecticut, has launched he "personal colour computer — the Timex/Sinclair 2068 With this computer Timex hopes to capture a large part of the home computer market in the US, which is still very underdeveloped in comparison to the UK

Over the last two years Timex has been selling the ZX81 — repackaged as the TS1000 — on a royalty basis with Sinclair Research Ltd But, Timex wants to become a computer designer and manufacturer in its own right It has a large workforce and many factories that are having to diversify as the Timex watch business continues to shrink. The TS1000 gave Timex its first experience of the home computer market and the company decided that continuing investment should be made in the computing business

When the Spectrum was launched in the UK (April 1982) the management of Timex made the decision — rightly or wrongly — not simply to repackage the Spectrum to American standards, but to modify the computer There is no doubt that the TS1000 is a nice machine But can Timex still make sufficient profit when relatively unsuccessful machines are being 'dumped' in large quantities?

Instead of the functional and economic appearance of the Spectrum, the Timex machine has a silvered case (38x19x4 cm) with finely designed lines and mouldings The keyboard has full-travel solid keys that are certainly easier to use for a typist To the right hand side of the keyboard is a Rom cartridge compartment — with a lid — into which games cartridges and language cartridges can be slotted and a joystick port

On the left-hand side of the casing is a 'rocker On/Off switch and a left-joystick port On the rear of the machine are the tv outlet the power socket, ear and mic sockets for the cassette player, a monitor output and, finally, the familiar edge connector for the printer etc

Underneath the machine is a small tv channel selector and a grill through which one can see the loudspeaker

Initially therefore, the Timex 2068 might be considered very different in appearance from the Spectrum, but bear in mind that the keyboard area is exactly the same size on both machines It is nice Inough to have the facilities of the ZX Interface 2 — the Rom slot and the joystick ports — built into the machine

Like the Spectrum, the Timex 2068 computer uses a Z80A microprocessor running at 3.5 mhz Also the tv monitor display is generated, for the most part by a custom-built ULA — which in the Spectrum is the familiar chip shape but in the Timex 2068 is one of the 'new' square ones

There are three definite ways in which the hardware of the Timex machine is different to that of the Spectrum Firstly, the sound chip The Timex computer retains the single loudspeaker of the Spectrum but in addition to being able to 'toggle' the loudspeaker on and off — using *Beep* or *Out* — it is possible to control the output by programming an *AY-3-8912* sound chip using *Sound*

Secondly the display modes The hardware of the Timex 2068 allows for four distinct display modes but apart from Mode 1 (Normal) they are only available from machine code

Mode 1 — Normal —
one display file of 6K.
one attribute file of ¾K
Mode 2 — 64 characters c 2 colours
—two display files of 6K (the characters are taken from each display file in turn)

Mode 3 — Second screen
—uses the second display file and the second attributes file
Mode 4 — Ultra high colour resolution
—one display file of 6K to hold 768 characters (normal number)
—uses the second display file to hold an attribute byte for each pixel of the characters

There is no doubt that Rom cartridge programmers will try to make the best of these different display modes

Finally the bank switching The Timex 2068 has been designed with 'extendability in mind and this is best shown by the provision for 'bank switching In this machine it is possible to use at any single moment in time any 8K chunk of memory from any of 256 memory banks — provided that the area 6000 *7FFFh* is always left alone

At the moment only the Rom cartridges use the bank switching but in time 'intelligent devices are expected to become available — these will be serviceadle without taking up valuable user Ram

The memory bank *254* is unavailable for use by external devices as it is this bank that contains the Basic extension Rom This Rom contains code that proved to be impossible to fit in the normal 16K Rom Therefore it can be considered that the Timex 2068 has a 24K Basic operating system

The Timex 2068 uses Sinclair Basic — it

is certainly a surpnes at first to find a microcomputer that does not look like a Spectrum coming alive with the message

© 1982 Sinclair Research Ltd

even if it is followed by

© 1983 Timex Computer Corp

Thereafter the Timex 2068 acts like a Spectrum All the familiar keywords are available and the syntax checking, that makes Sinclair Basic so nice to use works as well as ever

The Basic has however been slightly modified There are four extra command words and two extra function words *Delete m n* (where *m* and *n* must be specified but can be the same) — this command allows for a block deletion of lines from a Basic program If there is no line in the block then the report *Nonsense in Basic* is given

It is interesting to note that pressing the *Delete* key in K-mode writes *Delete* but in L-mode it deletes characters — this makes deleting a line number rather strange (keep the key pressed and *Delete* appears and disappears)

On Err (optional followed by *Goto Cont* or *Reset*) — an interesting command (taken from Apple Basic?) that allows the user to write error handling routines Initially, one uses — *On Err Goto line no* — which on execution makes most errors (including *Stop* and *Break* but not *Goto* past the program) lead to the error handling routine In this routine one can test the system variables to determine the error-type and error-statement, before correcting the error and using *On Err Cont* to try the erroneous statement once again

On Err Reset simply cancels the *On Err Goto* state There is nothing like using *On Err* for making your Timex 2068 hang-up — definitely a case for saving your valuable program before pressing Run

Reset — a command that clears streams and buffers for peripheral devices

Sound m n m n (where *m* is a register number and *n* a value) — the sound chip has three output channels and on each channel there can be either a tone or noise The volume of each channel can be altered independently, as can the frequency of any tone on a channel The channels can be synchronised by enabling them at the same time For example, on the BBC microcomputer, all the outputs can be produced with 'attack', 'hold' and 'decay phases

The *Sound* command leaves the programmer with a lot of work to do, as there is no help from the Basic in the formulation of the appropriate values of *m* and *n* A last point to be made about the souhd chip is that at least on the review Timex 2068 the sound output is very very quiet — will this please parants?

The first extra function word is *Free* This new function returns a value that is a fair estimate of the free user Ram The Timex 2068 has 48K of Ram, but *Print Free* by itself, gives the result *38652*, ie 37¾K available for Basic programs

The other function word addition is *STICK (m n)* (where *m=1* for joystick or *m=2* for pushbutton *n=1* or *n=2*, for left or right joysticks) This function returns a value in the range 0-15 depending on the input from the appropriate joystick

There is almost total compatibility between the two machines, but care has to be taken with respect of the new commands and functions on the Timex machine Also, the Basic program area starts at location *23755* in the Spectrum and location *27610* in the Timex 2068 Most machine code programs of course, will not translate from one machine to the other

In conclusion, the Sinclair Spectrum is an excellent microcomputer — its popularity proves that — but to be successful it has had to be produced cheaply It lacks a respectable keyboard and peripherals have to be attached to a single edge connector

As to the Timex 2068 well, it is a 'pretty machine It has a more reasonable keyboard, but it does clatter It has better sound, but it is difficult to program and the volume is low It has less 'bugs than the Spectrum — many of the easy ones have been corrected (division, *Screen$*, *Str$ "a"+0 1*, etc), but not all *Print Int −65536* is still '−1'

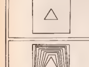
The Timex 2068 is worthy of the accolade Spectrum Mark II, but it will be in short supply for a long while yet as will good software to use with it I have no doubt that Timex will succeed with his venture, but this country, and especially Sir Clive's Sinclair Research, is still a long way in front. ■

Contoured patterns

***Bryan Skinner** shows how 'contour mapping' can produca visual displays*

Contour mapping can provide some very pleasing visual displays This program draws one shape within another, then 'fills the gaps between with contour lines For example, given a triangle within a square (Figure 1) the program will produce a pattern as in Figure 2

Figure 1



The program may appear somewhat complicated but this is more because of the necessary use of parentheses than much else In fact it may be broken down into about seven modules with relatively simple functions

Three dimension or numeric arrays are used X Y and D Array X holds the x-coordinates of the two figures – X(1 1) refers to the first X point of the other shape and X(2 3) gives the third X point of the inner shape Array Y behaves similarly for the Y-coordinates of the two shapes The two DATA statements at the end of the program define the outer and inner polygons in that order The data is in the form X_1 Y_1, X_2 Y_2 ... Xn Yn Line 20 specifies the number of points of each shape N1 being the outer Lines 40-70 simple *Read* the Data into arrays X and Y and draw the two polygons

The array D is used to hold the number of the nearest point of the inner shape to each point of the outer shape This is best explained by means of a diagram (Figure 3)

Figure 3

LINKS

Outer	to Inner
1	1
2	1
3	2
4	2
5	3
6	3
7	1

The nearest point of the inner shape to an outer point is determined by three routines

(i) lines 90-110
(ii) lines 130-170
(iii) line 250

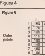
(i) line 100 calculates the absolute value of the sum of the differences between the x and y coordinates of a given inner and an outer point It thus provides a measure of the relative distance of one point from another ie

ABS(Xi–Xo) + ABS(Yi–Yo)

where Xi stands for the X-coordinate of an inner point

Lines 90 and 110 calculate this value for each inner point relative to each outer point the results being put into array *D* The outcome of this process is shown in Figure 4

Figure 4



Outer points	1	2	3
1	160	210	200
2	70	80	110
3	190	160	230
4	115	105	156
5	180	130	140
6	140	130	100
7	150	160	110
8	60	70	80

Inner points

Representation of the contents of array D after calculating the distance of each outer point to each inner point

(ii) This routine alters the contents of array *D* by replacing the differences with reference numbers the smallest difference being given the lowest number

This is shown in Figure 5

Figure 5

Outer points	1	2	2
1	1	3	2
2	1	2	3
3	2	1	3
4	2	1	3
5	3	1	2
6	3	2	1
7	2	3	1
8	2	3	1

Inner points

Representation of array D after ranking the differences in fig 4 by row

(iii) line 250 This allocates the nearest point of the inner shape to the variable *J* for line drawing omitting this line gives some interesting results

The main part of the program is contained in lines 190-320 To understand these more diagrams are necessary Figure 6 shows that the goal is to construct imaginary lines between two points to divide these in ratios and to link the resultant points Note that the lines thus drawn will not necessarily be parallel see Figure 7 The step size is given by line 200 — set at 30 but higher values will increase the density of the pattern by plotting more lines

Figure 6

Figure 7

The division of the imaginery lines 1-1 and 2-2 is calculated in line 220 to set it to ¾ ½ ¼ etc so that the halfway point of line 1-1 may be linked to the halfway point of line 2-2 and so on

Lines 270 — 320 function as follows

270 — calculates *A* (the next *X* coordinate) by defining the difference between an outer point s x-coordinate and the corresponding inner point s x coordinate *(Xi–Xo)* It then multiplies this difference by the current division factor (¼ ½ ¾ etc) and finally adds this to *Xo* Line 280 simply rounds the value of *A* Lines 290 and 300 perform similar calculations for the points' *Y* coordinates to define the next *Y* coordinate as *((Yi–Yo)*ST)+ Yo*

A and *B* thus define the next point to which a line is to be drawn

Line 310 uses the Dragon command *Line* missing the first parameter which causes a line to be drawn from the end of a previous line to the coordinates given

You should be able to create some interesting patterns by altering the shapes defined by the Data statements in 340 and 350 — but don t forget to alter *N1* or *N2* in line 20 if you change the number of points of either figure Note that the inner shape must have fewer points than the outer and that the points must be given in the Data statements in clockwise order or odd effects will occur

As mentioned above altering the value of *S* in line 200 will alter the closeness of the contour lines drawn Finally changing the *Pmode* and *Screen* variables in line 10 and perhaps adding *Color Rnd(4) Rnd(4)* to line 310 should yield some colourful results

Some users might find alternative uses for some of the modules for example the routine in lines 130 170 could be used to rank a set of data prior to some statistical calculations ■

```
10 PMODE 4,1 : PCLS : SCREEN 1,1
20 N1 = 8 : N2 = 3
30 DIM X(2, N1), Y(2, N1), D(N1,N2)
40 FOR I = 1 TO N1 : READ X(1,I) : READ Y(1,I): NEXT
50 DRAW "BM" + STR$(X(1,1)) + "," + STR$(Y(1,1)) : FOR I = 2 TO N1
60 LINE -(X(1,I),Y(1,I)),PSET : NEXT : LINE -(X(1,1),Y(1,1)),PSET
70 FOR I = 1 TO N2 : READ X(2,I) : READ Y (2,I) : NEXT
80 DRAW "BM" + STR$(X(2,1)) + "," + STR$(Y(2,1)) : FOR I = 2 TO N2
90 LINE -(X(2,I),Y(2,I)), PSET : NEXT : LINE -(X(2,1),Y(2,1)),PSET
88 REM DIFFERENCES
98 FOR NO = 1 TO N1 : FOR IN = 1 TO N2
100 D(NO,IN) = ABS(X(1,NO)-X(2,IN)) + ABS(Y(1,NO)- Y(2,IN))
110 NEXT : NEXT
120 REM RANK DIFFERENCES
130 FOR B = 1 to N1 : FOR R = 1 TO N2
140 BN = B : FOR C = 1 TO N2
150 IF D(B,C) > BN THEN BN = D(B,C) : EN = C
160 NEXT : D(B,EN) = N2 + R + 1
170 NEXT : NEXT
180 REM START AND SET DIVISIONS FOR LOOP
190 DRAW "BM" + STR$ (X(1,1)) + "," + STR$(Y(1,1))
200 S = 10
210 FOR I = 1 TO S
220 FOR F = 0 TO I-1 : ST = ST + I/S : NEXT
230 FOR EP = 1 to N1
240 FOR SS = 1 TO N2
250 IF D(EP,SS) = 1 THEN J = SS
260 NEXT
270 A = X(1,EP) + (ST*(X(2,J)-X(1,EP)))
280 A = INT (A + .5)
290 B = Y(1,EP) + (ST*(Y(2,J)-Y(1,EP)))
300 B = INT (B + .5)
310 LINE - (A,B),PSET
320 NEXT : ST = 0 : NEXT
330 GOTO 330
340 DATA 10,170,60,90,10,20,100,40,200,20,240,100,200,110,130,150
350 DATA 110,110,130,80,150,110
```


VALH
48K SPECTRUM

A slice of the pie

***Richard Dodd** explains how to draw a pie chart on the hi-resolution screen*

This program for the Dragon 32 computer draws and labels a pie chart on the high resolution screen. Most of the program is used to store the characters that need to be drawn to the screen.

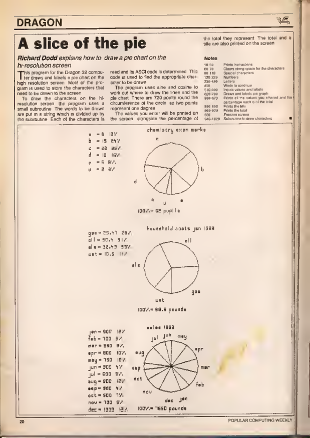
To draw the characters on the hi-resolution screen, the program uses a small subroutine. The words to be drawn are put in a string which is divided up by the subroutine. Each of the characters is read and its ASCI code is determined. This code is used to find the appropriate character to be drawn.

The program uses sine and cosine to work out where to draw the lines and the pie chart. There are 720 points round the circumference of the circle, so two points represent one degree.

The values you enter will be printed on the screen, alongside the percentage of the total they represent. The total and a title are also printed on the screen.

Notes

10-50	Prints instructions
60-70	Clears string space for the characters
80-110	Special characters
120-220	Numbers
230-480	Letters
490	Waits to continue
510-600	Inputs values and labels
620-790	Draws and labels pie graph
800-870	Prints all the values you entered and the percentage each is of the total
880-890	Prints the title
900-920	Prints the total
930	Freezes screen
940-1820	Subroutine to draw characters



```
10 CLS
20 PRINT TAB(5);"**********************"
30 PRINT TAB(5);"*      PIE  GRAPH      *"
40 PRINT TAB(5);"**********************"
50 PRINT:PRINT"WITH THIS
   PROGRAM YOU CAN ENTER UP TO
   12 VALUES ,WHICH WILL
   BE  DRAWN UP AS A PIE
   CHART. ALONG  WITH THE
   CHART ALL THE VALUES
   THAT YOU HAVE ENTERED WILL
   BE   PRINTED AS WELL AS
   THE TOTAL    AND THE
   PERCENTAGE EACH IS OF
   THE TOTAL.'
60 REM *****CHARACTERS*****
70 CLEAR 5000:DIM LC$(122)
80 LC$(32)="BR4"
90 LC$(37)="BU5U1BR4R1D1G4D
   1R1BR5BU1D1AR1"
100 LC$(46)="BR1U1D1R1U1D1BR3"
110 LC$(61)="BR2BU2NR4BU2R4BD
    4BR2"
120 REM *****NUMBERS*****
130 LC$(48)="U6R3D6L3BR6"
140 LC$(49)="BR2NU6BR3"
150 LC$(50)="BU6R3D3L3D3R3BR3"
160 LC$(51)="R3U3NL3U3L3BD6BR6"
170 LC$(52)="BU6D3R3BH1D4BR4"
180 LC$(53)="R3U3L3U3R3BD6BR3"
190 LC$(54)="U3R3D3L3U6R3BD
    6BR3"
200 LC$(55)="BU6R3D6BR3"
210 LC$(56)="R3U3L3U3R3D3L3D
    3BR6"
220 LC$(57)="R3U6L3D3R3D3BR3"
230 REM *****LETTERS*****
240 LC$(65)="BU4R3D4L3U2R3BF
    2BR1"
250 LC$(66)="NU8R3U4L3BD4BR6"
260 LC$(67)="U4HR3D4R3BR3"
270 LC$(68)="R3U8D4L3D4BR6"
280 LC$(69)="U2R3U2L3D4R3BR3"
290 LC$(70)="BR1U0HR2D4L1R2BD
    4BR3"
300 LC$(71)="BD4R3U8L3D4R3BR3"
310 LC$(72)="U8D4R3D4BR3"
320 LC$(73)="U4BU2U1BD7BR5"
330 LC$(74)="BD4R3U8BD4BR3"
340 LC$(75)="U8D6R1NE2F2BR3"
350 LC$(76)="U8D8BR5"
360 LC$(77)="U4R2HD4R2D4BR3"
370 LC$(78)="U4R3D4BR3"
380 LC$(79)="U4R3D4L3BR6"
390 LC$(80)="R3U4L3D8U4BR6"
400 LC$(81)="BF4U8L3D4R3BR3"
410 LC$(82)="U4R3D1BD3BR3"
420 LC$(83)="R3U2L3U2R3BD4BR3"
430 LC$(84)="BR1U4R1L2R1U2D
    6R2BR3"
440 LC$(85)="NU4R3NU4BR3"
450 LC$(86)="BU4D2F2E2N
    U2BF2BR1"
460 LC$(87)="NU4R2NU4R2NU4BR3"
470 LC$(88)="E4BL4F4BR3"
480 LC$(89)="NU4R3U4D0L3R3
    U4BR3"
490 PRINT:PRINT"ANY KEY TO
    CONTINUE" EXEC 41194:CLS
500 O=(22/7)/360
510 REM ****INPUT VALUES****
520 INPUT"HOW MANY VALUES (MAX
    12)";N:IF N>12 THEN
    CLS:GOTO 520
530 DIM V(N),V$(N)
540 FOR X=1 TO N
550 PRINT"NAME";X;:INPUT"(3
    CHAR)";V$(X):IF LEN(V$(X)
    )<>3 THEN GOTD 550
560 PRINT"VALUE(2 DEC)";X:
    :INPUT V(X)
570 T=T+V(X)
580 NEXT
590 PRINT:INPUT"TITLE",T$ IF
    LEN(T$)<1 THEN GOTD 590
600 PRINT INPUT"UNITS";U$:IF
    LEN(U$)<1 THEN GOTD 600
610 D=720/T
620 REM ******DRAW PIE GRAPH***
630 PMODE 4:PCLS 1:SCREEN 1,1
640 CIRCLE (168,88),55,0
650 FOR Y=1 TO N
660 I=I+V(Y)
670 X=O*(I*D)
680 I1=I-V(Y)/2
690 X1=O*(I1*D)
700 A=(SIN(X)*55)+168
710 B=(COS(X)*55)+88
720 LINE(168,88)-(A,B),PRESET
730 E=(SIN(X1)*70)+168
740 F=(COS(X1)*70)+94
750 DRAW"C0"
760 DRAW"BM"+STR$(INT(E))+",
    "+STR$(INT(F))+";"
770 A$=V$(Y)
780 GOSUB 940
790 NEXT
800 X2=2:Y2=2
810 FOR X=1 TO N
820 Y2=Y2+15
830 PE=INT(((V(X)/T)*100)+0.5)
840 V$(X)=V$(X)+"="+STR$
    (V(X))+" "+STR$(PE)+"%"
850 DRAW"BM2,"+STR$(Y2)+";"
860 A$=V$(X):GOSUB 940
870 NEXT X
880 DRAW"BM120,8;"
890 A$=T$ GOSUB 948
900 DRAW"BM180,180,"
910 A$="100%="+STR$(T)+" "+U$
920 GOSUB 940
930 GOTO 930
940 REM **********************
950 REM * LETTERS SUBROUTINE *
960 REM **********************
970 FOR N=1 TO LEN(A$)
980 K$=MID$(A$,N,1)
990 R=ASC(K$)
1000 DRAW LC$(R)
1010 NEXT
1020 RETURN
```

Accessed functions

***A Servini** presents a program to access scientific functions from machine code*

One of the disadvantages of Basic is that it is so slow, as any serious games programmer should know. Machine code is fine as far as speed is concerned, but lengthy assembler or hex coding can be tedious.

To overcome both problems, I recently bought one of the Basic compilers currently available on the market. However these have the disadvantage of not being able to handle scientific functions as they are integer compilers.

So here I have dipped into machine code to develop a small routine to interface between compiled Basic and the scientific functions handled by the calculator subroutine within the Spectrum Rom.

The compiler is only able to handle integers between −32766 and 32767. This data when converted to its binary format occupies two eight bit bytes. To access this from machine code the data must first be *Poked* into a two byte area of Ram.

The machine code routine then *Loads* the data into the *C* and *D* registers. The *C* register is then tested for either a set or reset sign bit — and accordingly, the *E* register is *Loaded* with either 255 for a set bit (255 is two's complement for −1) or zero for a reset bit. This is done because of the way the Spectrum holds integers within its calculator 'stack' as these are held as five bytes on the "stack" (floating point numbers are also held as five bytes).

The order in which these are held is

BYTE	*INTEGER FORMAT*
A	Always zero
B	Always zero
C	High byte (holds the sign bit)
D	Low byte
E	Either zero or 255

These correspond to the *A, B, C, D* and *E* registers which are *Loaded* with these bytes and passed to the 'stack' via the Rom 'stack-store' subroutine (*2AB1* hex).

In the following machine code routine the first number represented in integer format is the constant 32767 — after this is the data and finally the constant 1000.

The five byte numbers are stacked in this order because the calculator 'stack' operates on a last in, first out basis. When the calculator performs an operation on the two top numbers on the 'stack', the stack decreases by one and the result is put on top of the stack.

The calculator is then called up by the *RST 0028h* instruction. The five literals which follow in the machine code routine call up the calculator functions (such as — *Add, Divide, Sin, To Power*, etc). The calculator is terminated by the literal *38h* and the result (now on the top of the calculator "stack") is retrieved via the 'stack-fetch' subroutine (*2BF1h*) which passes the result to the *A, B, C, D* and *E* registers.

Only the *C* and *D* registers are required, however, as the *A* and *B* registers always hold zero for integers. Also the *E* register is not required, as compiled Basic will automatically assign a negative value to the final result if it is greater than 32767.

The two constants are used to manipulate data to and from the machine code routine, because the compiler does not handle fractional values. So, if significant places are not to be lost after the decimal point, a number such as 3.786 can be input as 3786 and divided by 1000 from within the machine code — this is then presented to the *Sin* function as 3.786. The final result is also passed to Basic as a number between −32767 and 32768 which represents a number between −1 and +1.

The machine code routine as it stands can only perform one function, namely *Sin x*. However, further modification could be done where the literals are stored in a table, and loaded as required into the address which corresponds to the required literal. For example, the literal *20h* could be substituted for *1Fh* and the routine would perform *Cos X*, etc.

The routine as written, loads into the printer buffer area in Ram (*5B00h*). For those who want to move the routine into the user graphics area, change the start address to *7F58h*, *Loop* to *7F70h*, *First* and *Dout* to *7F8Eh*. In the following Basic routine change 23350 to 32654, 23351 to 32655 and 23296 to 32600.

Finally, here is the Basic routine required to *Poke* the input data to the machine code routine, and also to *Peek* from machine code the result of the calculation.

```
100 INPUT "number? ";B
110 IF B<0 THEN LET B = B + 65536
120 LET A = INT (B/256)
125 LET B = B - A*256
140 POKE 23350,A
150 POKE 23351,B
160 LET MC = USR 23296
170 LET A = PEEK 23350
180 LET B = PEEK 23351
190 LET A = A*256 + B
200 PRINT A: STOP
```

An assembler listing of the machine code routine.

```
ADDR HEX        OP     OPERANDS        COMMENT
5B00 3E00       LD     A,0
5B02 0600       LD     B,0
5B04 0E7F       LD     C,127           put the
5B06 16FF       LD     D,255           constant 32767
5B08 1E00       LD     E,0             on the stack.
5B0A CDB12A     CALL   2AB1h
5B0D 21365B     LD     HL,FIRST
5B10 4E         LD     C,(HL)          take data from
5B11 CB79       BIT    7,C             the 2 byte area
5B13 CA185B     JP     Z,LOOP            and
5B16 1EFF       LD     E,255           put it onto
5B18 23    LOOP: INC   HL              the stack.
5B19 56         LD     D,(HL)
5B1A CDB12A     CALL   2AB1h
5B1D 0E03       LD     C,3             put the
5B1F 16E8       LD     D,232           constant 1000
5B21 1E00       LD     E,0             onto the stack.
5B23 CDB12A     CALL   2AB1h
5B26 EF         RST    0028h           call calc.
5B27 05         DEFB     05h           literal divide.
5B28 1F         DEFB     1Fh                   sine.
5B29 04         DEFB     04h                   multiply.
5B2A 3A         DEFB     3A                    truncate.
5B2B 38         DEFB     38h                   end calc.
5B2C CDF12B     CALL   2BF1h
5B2F 21365B     LD     HL,DOUT
5B32 71         LD     (HL),C          pass result back
5B33 23         INC    HL              into the 2 byte
5B34 72         LD     (HL),D          area.
5B35 C9         RET
FIRST: EQU 5B36
DOUT: EQU 5B36
LOOP: EQU 5B18
```

Displayed text

***David King** explains how to write a titles program for vidao*

As explained in Andrew Homer's article *Letters of Credit* (*PCW*, 15-21 September), time and money can be saved by using a computer connected to a video recorder to record captions or messages rather than adhesive lettering in front of a camera. Using a computer program can also make synchronisation with music particularly simple the operator can listen to the chosen music and press a key on the appropriate beat, causing either a number of lines to reveal or the page to change

The program in Listing 1 is well suited to this use Starting with a blank screen, lines of data are shown whenever the space-bar is pressed Looking at how the data is stored reveals at line 500 the number of complete pages in the sequence which is read and used at lines 40 and 50 The following lines of data are read at line 80 Variables X and Y represent the horizontal and vertical position at which the lines of text stored in the variables *Words$* will be printed If *Pause$* is 'Y' then the display will pause until the space-bar is pressed If *Pause$* is 'N' then the next line of that page will be printed If *Double$* is "Y" then that line will be printed at double height

What does take time with a program like this is calculating the values of *X* and *Y* for each line This normally entails breaking into the program several times to alter the values One way round this is to have a program that works out the values for you This week we will look at two procedures that quickly make these calculations Next week we will fit the programs into a master program which after evaluating your inputs creates and records a new program on to cassette or disc The generated program will be the same as Listing 1 but with your own data recorded

The cursor control keys with their clearly marked arrows are the obvious ones to use for positioning text on the screen but they do not normally give a code when pressed that is recognisable to a Basic program waiting for an input The inclusion of the command **FX 4 1* in the program will make the cursor keys give ASCII numbers 138 for down, 139 for up

The procedure in Listing 2 starts by positioning the cursor at *Tab(4 10)* where we can see it clearly Pressing the arrows for up and down either adds to or subtracts from the value of Y If you try to go off-screen the computer makes a noise (VDU 7) The computer ignores other pressed keys, except the <RETURN> key (ASCII value 13) which terminates the procedure

Now the vertical position (variable Y) is finalised the second procedure (Listing 3) calculates the value of X All users have to do is type in whatever they want to see displayed The procedure automatically prints the line in the centre of the screen producing the rather entertaining effect of words growing out from the middle of the line as you type The variable line indicates the number of the text line being created

The variable max at line 490 should contain the maximum number of letters per line this is 39 in mode 7 and 19 in mode 5 Although we are dealing with text line 530 produces the ASCII number of the key pressed rather than a string This is so that the procedure can detect the return key (13) or delete key (127) being pressed

Line 560 copes with stripping *Words$* of the last character when the DELETE key has been pressed When appropriate line 570 adds a character to *Words$* The line of text being processed is kept in the centre of the screen by lines 580 and 610

We now have two procedures for positioning text the end of the second procedure sets the reveal delay variable *Pause$* for the line Next week, we look at *PROC saver* how it creates and records the display program and provide a listing of the whole of the master program ■

David King
Computer Based Learning Centre
Dudley College of Technology
Dudley
West Midlands DY1 4AS

Listing 1

```
  10 MODE 7
  20 VDU23;11,0;0;0;0
  30 PROCspace
  40 READ P
  50 FOR page=1 TO P
  60 CLS
  70 REPEAT
  80 READ X,Y,words$,Pause$,Double$
  90 IF X=90 THEN 120
 100 IF Double$="Y" THEN PROCDBL(X,Y,words$)
ELSE PRINTTAB(X,Y);words$
 110 IF Pause$="Y" THEN PROCspace
 120 UNTIL X=90
 130 PROCspace
 140 NEXT page
 150 CLS:PROCspace:VDU23;11,255;0;0;0
 160 END
 200 DEFPROCspace:*FX15,0
 210 REPEAT UNTIL GET=32:ENDPROC
 250 DEFPROCDBL(X,Y,words$)
 260 PRINTTAB(X,Y)CHR$141;words$
 270 PRINTTAB(X,Y+1)CHR$141;words$
 280 ENDPROC
 500 DATA 2:REM no. of pages
 505 DATA 7,6,"TESTING TELETEXT CAPTIONS",N,
N
 510 DATA 11,10,"PROGRAM GENERATOR",Y,N
 515 DATA 15,15,"PAGE ONE",N,Y
 520 DATA 90,0,"0",N,N
 525 DATA 15,5,"PAGE TWO",Y,N
 530 DATA 17,10,"THE ",N,Y
 535 DATA 17,14,"END ",N,Y
 540 DATA 90,0,"End ,N,N
 595 REM DK DCT caption program
 600 REM generator  <C> dk 1983
```

Listing 2

```
 390 DEFPROCpos_curs
 400 X=4:Y=12:GOTO450
 410 key_pressed=GET
 420 IFkey_pressed=138THENY=Y+1:IFY>24THEN Y=24:VDU7
 430 IFkey_pressed=139THEN Y=Y-1:IFY<1THEN Y=1:VDU7
 440 IFkey_pressed=13 THEN460
 450 PRINTTAB(X,Y);:GOTO410
 460 X(line)=X:Y(line)=Y
 470 ENDPROC
>
```

Listing 3

```
 490 DEFPROCline(max)
 500 PRINTTAB(0,0)" ";:PRINTSTRING$(39," ")
 510 PRINTTAB(2,0) Words then RETURN";len=0
 520 *FX15,0
 530 key_pressed=GET
 540 IFkey_pressed=13 THEN 630
 550 IF len>=max AND key_pressed<>127 THEN VDU7:GOTO52
0
 560 IF key_pressed=127 THEN words$(line)=LEFT$(words$
(line),len-1):GOTO580
 570 words$(line)=words$(line)+CHR$(key_pressed)
 580 len=LEN(words$(line))
 590 PRINTTAB(0,Y(line)) ";:PRINTSTRING$(39," ")
 600 :
 610 X(line)=(max DIV2)-(len DIV2): PRINTTAB(X(line),Y
(line));words$(line)
 620 GOTO530
 630 PRINTTAB(2,0)"  Delay (Y/N)  _  ";:PRINTSTRING$(2
0,"  ")
 640 key_pressed$=GET$
 650 IFkey_pressed$<>"Y" AND key_pressed$<>"N"THEN640
 660 Pause$(line)=key_pressed$
 670 ENDPROC
```


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CHOOSING A HOME MICRO

WARNING

Choosing a home micro can be a daunting task to the newcomer, and with an ever increasing number of micros emerging on the market, even up-grading, say, from a ZX81 can be a risky and expensive exercise if the wrong decision is made. It is important to look at the real facts and specifications, and check exactly what you get for your money before choosing your micro-computer system.

THE PITFALLS

"DON'T LET THE ADD ONS ADD UP"

A number of large companies are offering packages that seem to be good value and low cost.
These offers usually have a hidden sting inasmuch as the essential accessories such as connection leads peripherals and software often carry very high cost premiums e.g. software for low cost hardware usually costs between £29 and £49 for a ROM cartridge!!

CHECK THE QUALITY OF THE PRODUCT.

Raw materials are now an area where corners can be cut and shoddy workmanship during building can effect the up-time of your unit. Areas to watch out for are unreliable edge connectors corrosion and poor quality P.C.B.s. Low quality components and bad design will seriously effect the reliability of the end product and can lead to false economy

DON'T BUY A GAMES MACHINE

Unless you want just games and nothing else! With a games computer you are limited
Some computers however have the advantage of both games facility plus the whole world of computing to explore as your interest and skills develop. A real computer system will allow you to expand your knowledge of the Hi Technology world and help earn its keep with its added uses in the field of education communication and home business use

SOFTWARE

Make sure the system you choose has a growing library of support software to enable you to realise the full potential of your machine

KEY POINTS TO LOOK FOR

● High Resolution Colour

In general most home computers have a poor graphics resolution (or detail). Check on the vertical and horizontal resolution in graphic mode and multiply the two numbers together. If the result is less than 35 000 then the graphics can hardly be considered high resolution. Without high resolution graphics displays such as those used in games tend to be "Chunky" in appearance

● High Quality Sound

Some computers claim to provide a sound channel when in reality all that can be found inside the computer is a small buzzer controlled by electronic pulses. At the very least a sound facility should provide more than one channel and a noise channel as well (for gun shot effects in games for example). The best systems also provide envelope control of the sound channels to produce very sophisticated effects very important for generating music. Also look for the ability to connect to external amplifiers

● Keyboard

For accurate entry of programs and data into a computer it is important that the keyboard has a good tactile feel in operation. Coupled with acoustic feedback the user is fully aware when the computer has accepted his/her actions. Also of importance in a keyboard is layout. A standard computer keyboard layout will familiarise the user with the vast majority of computers used in the world of business and professional applications, very important if the purpose of purchasing a computer is educational

● RAM

One of the most important features of a computer is the amount of RAM or memory included. In general the more powerful and exciting a computer program is the more RAM it requires. But take care all computers are advertised quoting the total RAM used in the system. Computers use up a great deal of their own RAM for storing essential data and particularly in supporting the graphics display and the CPU. If it is less than 32K think again is it enough?

● Computer Language

It is too difficult to program a computer in its own binary language so high level languages are used the most popular being BASIC. However there are a number of BASICs some being very different from the rest. A de facto standard in the computer industry is Microsoft BASIC. Learn this one and you will be able to program in the majority of computer BASICs such an important point if a home computer is to be used to educate your children to face the technology of the future

● Expansion

As your interest and knowledge of computing grows you will need a computer system that will grow with you able to accommodate Printers Disk drives Joysticks Communications Modem and Colour Monitor as well as produce Hi Fi sound effects

● Software

The computer you choose should have a growing selection of utility software to make the most of its capability
Remember computing is here to stay. You can't learn to compute on a toy or a device which does not behave like a real computer
In short look out for a computer which offers all the points above and you will be sure of getting the best value for money

Choosing the [illegible] money [illegible] Check full specification [illegible] prices before you buy. Preferably choose a Real computer system that can expand to meet your needs

To find out which company offers you the right choice, with:-

- **Good value, high specification, quality micros.**
- **A quality, 4 colour, plain paper printer/plotter.**
- **Communications Modem.**
- **Micro Disk Drives.**
- **Comprehensive and growing range of software**

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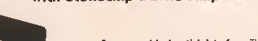


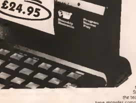
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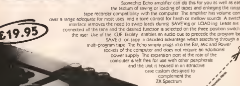




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Mathematical quiz

***Les Allan** presents a program to test your mathematical skills* – Little Professor

Little Professor for the Commodore 64 uses the hi res screen to draw the face of a professor and text for the questions on arithmetic

The menu at the start of the test allows the pupil a choice of 10 questions from one of the four functions and nine skill levels available Three attempts are allowed at each of the 10 questions — the correct answer is given should the 'pupil still fail to answer correctly

Upon completion of all 10 questions, the menu gives the following options

F1	further test on same function
F7	change function and/or skill level
F8	selects cold start

In selecting *F1* the skill level is increased up to a maximum of 25 for each time 10 correct answers have been made

Answers should be made to each question in the same manner as the 'pupil would enter them into text books These are from right to left and as 'units', 'tens', 'hundreds' etc Should an incorrect entry be made, the number can be deleted by pressing the *Del* key — the sum is entered with the *Return* key

The choice of a hi-res screen was made so as to provide some initial interest in watching the make up of the face it also allows ease of controlling the size of the character set and makes a more presentable program Text commands are repeated so as to allow the information to be written and then erased A simple screen clear would entail redrawing the original face again

As the level of difficulty increases the location of the question is moved to the right by one pixel for each skill level Also it is only possible to enter as many digits as there are numbers in the correct answer

The *Run/Stop* and *Restore* keys are disabled during the program in order to prevent accidental stoppage of the completed program — It takes several minutes to fully set up the initial screen I strongly recommend that *Poke 808 225* be omitted from line 16 until the program is fully working and saved However during the operation of the program, selection of *F8* after 10 questions have been answered will enable a break to be made This will of course reset the computer but olding prior to a new line number being entered will retain the original listing You have been warned!

Notes

16	clear screen disable run/stop and restore keys clear varibles
18	selects hi res screen, colour cyan with blue plotting colour
20 74	draws picture of professor
80 104	introduction text
112 124	select required function
138-158	select skill level
158-172	select random questions
174	checks number of questions answered
176	calculates number of digits in answer
182 190	print X
198-202	print Y
204	print function
206	draw line to length of maximum number
208	check to see if screen is being cleared
210	clear keyboard buffer
216-232	keyboard entry
220	delete last number entered
222	execute sum of entered answer
228	checks length of keyboard entry against answer
230	print keyboard entry
238-264	calculate answer and check if correct
245-254	print WELL DONE for 2 sec
250-258	update number of correct answers clear screen
264 274	print WRONG TRY AGAIN for 1 sec.
276-278	update number of wrong attempts retry if less than 3
280-290	print correct answer if number of attempts is greater than 3 for 1 sec.
292	clear screen
298-320	print result of 10 questions for 6 sec
324	increase skill level if all 10 correct
326	reset varibles
328-342	print menu at end of each 10 questions.
360-368	perform outcome of menu
372 376	delete character routine

Variables

K	number of entries
P	function key pressed
X	initial value of QX
Y	initial value of QY
AN	initial value of XT
CA	number correct answers
CC	counter in printing result
CP	initial value of CA
CS	clear screen
LL	length of line used during printing of question
OP	poke code for function required
QA	number of questions answered
OT	initial value of XT
QX	random value for first part of question
QY	random value for second part of question
RP	repeat an operation
SK	range of random numbers from O-SK
SL	skill level value
SU	SUM of question by pupil
VR	variable used in multiplication and division
WR	number of wrong numbers
XX	counter in printing QX
XT	answer to question box
YY	counter in printing QY
C1	LSB of CP
X1	LSB of X
X2	LSB of QT
X3	counter in printing correct answer
K$	keyboard entry
SL$	skill level entry
N(K)	used in printing keyboard entry





```
10
12 REM **** CLEAR SCREEN & DISABLE
   RUN/STOP RESTORE KEYS ****
14
16 PRINTCHR$(147) POKE808,225 CLR
18 HIRES0,3 COLOUR3,3
20 REC0 0,319,199,1
22 TEXT30,13,"LITTLE PROFESSOR"
   ,2,3,16
24 BLOCK34,8,280,30,2 BLOCK5
   47,151,51,1
26 LINE30,51,30,61,1 LINE156,51,
   166,61,1 LINE30,61,58,75,1
   LINE160,61,98,75,1
28 LINE35,54,35,58,1 LINE161,54,
   161,58,1 LINE35,58,98,78,1 LINE
   161,58,98,78,1
30 LINE35,54,161,54,1 PRINT48,56,1
32 ARC26,111,70,110,1,130,150,
   1 ARC90,89,137,223,1,100,100,1
34 ARC170,111,250,290,1,150,150,1
36 BLOCK35,90,55,110,1
   BLOCK38,93,42,102,2
38 BLOCK110,90,160,110,1
   BLOCK113,93,137,102,2
40 LINE20,85,34,90,1 LINE20,90,
   34,101,1 PRINT22,92,1
42 LINE175,85,161,90,1 LINE175,90,
   161,101,1 PRINT174,96,1
44 ARC97,100,270,90,1,15,15,1 ARC97,
   100,270,90,1,14,14,1
46 CIRCLE60,100,11,8,1 CIRCLE60,100,
   11,9,1 CIRCLE60,105,7,5,1
   PRINT60,105,1
48 CIRCLE135,100,11,8,1 CIRCLE135,
   100,11,9,1 CIRCLE135,105,7,5,1
   PRINT135,105,1
50 ARC25,112,190,342,1,20,20,1
   ARC170,112,20,150,1,20,20,1
52 ARC25,112,200,342,1,15,15,1
   ARC170,112,20,160,1,15,15,1
54 PRINT20,111,1 PRINT175,111,1
56 ARC97,100,90,270,1,10,10,1
58 ARC85,100,160,270,1,5,5,1
   ARC110,130,80,210,1,5,5,1
60 ARC80,70,160,205,1,40,40,1 ARC90,
   100,190,235,1,50,50,1
62 ARC115,70,155,192,1,50,50,1
   ARC105,140,125,170,1,50,50,1
64 LINE80,143,82,150,1 LINE169,
   143,104,150,1
66 LINE86,143,82,140,1 LINE109,
   143,113,140,1
68 LINE90,144,92,150,1
   LINE50,144,104,150,1
70 ARC54,122,240,45,1,4,4,1
   ARC142,127,340,110,1,4,4,1
72 ARC90,145,90,280,1,40,40,1
   ARC90,135,140,220,1,50,50,1
74 PRINT88,140,1
76
78
80 PROC INTRODUCTION
82 FORRP=0TO1
84 TEXT200,50,"HERE IS A SIMPLE",2,1,7
86 TEXT198,58,"TEACHING AID FOR",2,1,7
88 TEXT198,66,"YOUNG CHILDREN",2,1,8
90 TEXT198,83,"YOU ARE SET 10",2,1,8
92 TEXT198,90,"QUESTIONS BY",2,1,8
94 TEXT198,98,"SELECTION OF THE",2,1,7
96 TEXT198,106,"FOLLOWING KEYS",2,1,8
98 TEXT204,124,"F1........ADD",2,1,7
100 TEXT204,132,"F3....SUBTRACT",2,1,7
102 TEXT204,140,"F5....MULTIPLY",2,1,7
104 TEXT204,148,"F7.....DIVIDE",2,1,7
106 IFRP=1THENCALL PRINT SKILL LEVEL
108
110
112 PROC OPERATOR
114 P=INKEY
116 IFP<>1ANDP<>3ANDP<>
    5ANDP<>7THENCALL OPERATOR
118 IFP=1THENOP=43
120 IFP=3THENOP=45
122 IFP=5THENOP=42
124 IFP=7THENOP=47
126
128
130 PROC PRINT SKILL LEVEL
132 TEXT204,160,"SKILL LEVEL",2,1,9
134 TEXT224,184,"[1-9]",2,1,10
136 IFRP=1THENRP=0 CALL RANDOM NUMBERS
138 POKE198,0
140
142
144 PROC SKILL LEVEL
146 GETSL$ SL=VAL(SL$)
148 IFSL$=""ORSL$<"1"ORSL$>
    "9"THENCALL SKILL LEVEL
150 NEXT
152
154
156 PROC RANDOM NUMBERS
158 IFOP=43OROP=45THENVR=1 ELSE VR=SL
160 SK=10*SQR(SL)
162 QX=INT(RND(1)*SK)
164 QY=INT(RND(1)*SK/VR)+1
166 IFOP=42THENXT=QX*QY
168 IFOP=43THENXT=QX+QY
170 IFOP=45THENXT=QX-QY IFXT
    <0THENCALL RANDOM NUMBERS
172 IFOP=47THENXT=INT(QX/QY) QX=QY*XT
174 QA=QA+1 IFQA>10THENCALL FINISH
176 LL=0 AN=XT REPEAT
    AN=INT(AN/10) LL=LL+1 UNTILAN=0
178
180
182 PROC PRINT X
184 X=0 WR=0
186 X=QX REPEAT
188 X1=X-(INT(X/10)*10)
    X=(X-X1)/10 XX=XX+1
190 CHAR275+SL-XX*12,60,
    48+X1,2,4 UNTILX=0
192
194
196 PROC PRINT Y
198 Y=QY REPEAT
200 Y1=Y-(INT(Y/10)*10) Y=(Y-Y1)
    /10 YY=YY+1 IFXX<YYTHENXX=YY
202 CHAR275+SL-YY*12,95,
    48+Y1,2,4 UNTILY=0
204 CHAR257+SL-XX*12,78,OP,2,4 IFXX<LL
    THENXX=LL
206 LINE272+SL,130,272+SL-XX*12,130,
    2 XX=0 YY=0
208 IFCS=1THENCS=0 CALL
    RANDOM NUMBERS
210 POKE198,0
212
214
216 PROC KEYBOARD ENTRY
218 GETK$
220 IFK$=CHR$(20)ANDK>0THENEXEC
    DELETE NUMBER
222 IFK$=CHR$(13)ANDK>0THENCALL
    SUM
224 IFK$=""ORK$<"0"ORK$>"9"THENCALL
    KEYBOARD ENTRY
226 K=K+1
228 IFK<LL+1THENN(K)=VAL(K$)
    ELSE K=K-1 CALL SUM
230 CHAR275+SL-K*12,130
    48+N(K),2,4
232 CALL KEYBOARD ENTRY
234
236
238 PROC SUM
240 SUM=0
242 FORS=0TOK-1 SUM=SUM+10*SBN(S+1) NEXT
244 IFABS(XT-SUM)>.5THENCALL WRONG
246 FORRP=0TO1
248 TEXT215,175,"WELL DONE",2,2,8
250 PAUSE2-RP*2 NEXT
252 REPEAT EXEC DELETE NUMBER
254 UNTILK=0
256 CA=CA+1 CS=1
258 CALL PRINT X
260
262
264 PROC WRONG
266 FORRP=0TO1
268 TEXT175,175,"WRONG TRY AGAIN",2,2,8
270 PAUSE1-RP NEXT
272 REPEAT EXEC DELETE
274 UNTILK=0
276 WR=WR+1
278 IFWR<3THENCALL KEYBOARD ENTRY
280 FORRP=0TO1
282 TEXT180,175,"CORRECT ANSWER",2,2,8
284 QT=XT REPEAT
286 X2=QT-(INT(QT/10)*10) QT=
    (QT-X2)/10 X3=X3+1
288 CHAR275+SL-X3*12,130,48+X2,2,4
    UNTILQT=0
290 PAUSE1-RP X3=0 NEXT
292 CS=1 CALL PRINT X
294
296
298 PROC FINISH
300 FORRP=0TO1
302 IFCA<6THENTEXT175,175,"NOT VERY
    GOOD !!",2,2,8
304 IFCA>5ANDCA<10THENTEXT175,175,"A
    VERY GOOD TRY",2,2,8
306 IFCA=10THENTEXT175,175,"EXCELLENT
    RESULT",2,2,8
308 IFCA<>10THENGS=6 ELSE GS=0
310 CP=CA REPEAT
312 C1=CP-(INT(CP/10)*10)
    CP=(CP-C1)/10 CC=CC+1
314 CHAR265-CC*12-GS,63,48+C1,
    2,4 UNTILCP=0
316 TEXT241,110,"10",2,4,12
318 LINE239,105,263,105,2
320 PAUSE5-5*RP
322 CC=0 NEXT
324 IFCA=10ANDSL<26THENSL=SL+1
326 CA=0 QA=0
328 FORRP=0TO1
330 TEXT152,72,"YOU HAVE ANSWERED",2,1,7
332 TEXT152,80,"ALL TEN QUESTIONS",2,1,7
334 TEXT159,104,"PRESS THE
    FOLLOWING",2,1,8
336 TEXT159,112,"KEYS TO CONTINUE",2,1,7
338 TEXT205,130,"[F1]....SAME",2,1,8
340 TEXT205,140,"[F7]..CHANGE",2,1,8
342 TEXT205,150,"[F8]....QUIT",2,1,9
344 IFRP=1THENCALL START
346
348
350 PROC RE-START
352 P=INKEY IFP<>1ANDP<>7ANDP<>8THENCALL
    RE-START
354 NEXT
356
358
360 PROC START
362 IFP=1THENCALL RANDOM NUMBERS
364 IFP=7THENCALL INTRODUCTION
366 IFP=8THENNRM COLD
368
370
372 PROC DELETE NUMBER
374 CHAR275+SL-K*12,130,48+N(K),2,4
376 K=K-1
378 END PROC
380
382
384
386
388 REM ******************************
390 REM ******************************
392 REM ****                      ****
394 REM **** LITTLE PROFESSOR     ****
396 REM ****                      ****
398 REM ****   SIMON'S  BASIC     ****
400 REM ****                      ****
402 REM ****    COMMODORE 64      ****
404 REM ****                      ****
406 REM ****     LES  ALLAN       ****
408 REM ****                      ****
410 REM **** 9TH SEPTEMBER 83     ****
412 REM ****                      ****
414 REM ******************************
416 REM ******************************

READY.
```

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the _Program of the Week_ double our new fee of £8 for each program published.

Hangman

on Dragon 32

Although only twenty words have been included to demonstrate the programme words may be added by changing the 10 in lines 10, 20 and 100 to the number of words in the data lines from 2000 onwards. To aid the younger players the alphabet is displayed and the letters are deleted as guessed.

Program notes

Lines	
10-30 and 2000-	Set up dictionary
100-200	Select word and set up screen
300-340	Input letter and check if already used
350-360	Clear letter from alphabet display
380-460	Check for letter in word and check if word complete
500-1020	Letter incorrect, draw next part of hangman

```
10 DIM D$(10)
20 RESTORE FOP D=1 TO 10
30 PEAD D$(D) NEXT D
100 N=RND(10) M=0 F=0 B$
 =""
110 A$=D$(N)
120 CLS6
130 PRINT@12,"hangman",
140 FOR N=65 TO 90
150 PRINT@N-30,CHR$(N),
160 NEXT N
170 L=LEN(A$)
180 PRINT@366 STPING$(L,
 45),
190 PPINT@416 PPINT@448,
 "      GUESS A LETTEP"
200 FOR P=1504 TO 1535 P
 OKE P,143 NEXTP
300 G$=INKEY$ IF G$="" G
 OTO 300
310 IF G$<"A" OR G$>"Z"
 THEN 300
320 Z=INSTR(1,B$ G$)
330 B$=B$+G$
340 IF Z<>0 GOTO 300
350 N=ASC(G$)
360 PRINT@N-30,CHR$(143)
 ,
370 X1=1 C=0
380 X=INSTP(X1,A$,G$)
390 IF X=0 GOTO 450
400 SOUND200,1
410 PRINT@365+X,G$,
420 X1=X+1
430 C=1 M=M+1
440 GOTO 380
450 IF C=0 GOTO 500
460 IF M=L THEN 1000 ELS
 E 300
500 SOUND1,1
510 F=F+1
520 ON F GOTO 600,650,70
 0,750,800,850,900,950,1
 000
600 PRINT@309,STRING$(7,
 175);
610 FOR P=360 TO 45 STEP
 -32
620 PPINT@P CHR$(175);
630 NEXT P GOTO 300
650 FOR P=169 TO 107 STE
 P -31
660 PRINT@P,CHR$(175), N
 EXT P
670 FORF=73 TO 82
680 PRINT@P CHR$(175),
690 NEXT P GOTO 300
700 PRINT@114,CHR$(218),
710 GOTO 300
750 FRINT@146,CHR$(120)+
 CHF$(213),
760 GOTO 300
800 FRINT@178 CHP$(218);
810 PFINT@210,CHP$(218),
820 PPINT@242,CHP$(219),
830 GOTO 300
850 FPINT@177,CHR$(220)+
 CHP$(216)+CHR$(220)+CHR
 $(221),
860 GOTO300
900 PRINT@209,CHP$(213);
910 PRINT@212,CHR$(213),
920 GOTO 300
950 PRINT@241,CNR$(222)+
 CHF$(216)+CNR$(220);
960 GOTO 300
1000 PPINT@273 CHP$(218)
 , PRINT@275,CNP$(218);
1010 PPINT@305,CHR$(218)
 , PRINT@307,CHR$(218),
1020 PRINT@416,"I WON MY
 WORD IS ",A$ PRINT
1030 FOP I=1 TO 5000 NEX
 T I
1040 FPINT@416 "DO YOU W
 ANT ANOTHER GAME (Y/N)
1050 Q$=INKEY$ IF Q$=""
 GOTO1050
1060 IF Q$="Y" GOTO 100
1070 END
1080 PRINT@422,"YOU WON
 THAT GAME" PRINT
1090 FOR I=1 TO 2000 NEX
 T I
1100 GOTO1040
2000 DATA ABRUPT,CASSETT
 E PROFILE COMPARE GRAVI
 TY
2010 DATA MODIFY DIVERSI
 ON,THOUGHT,GPAPHIC,CONJ
 URE
```

Hangman
by Brian Beesley

Pounds

on BBC Micro

This small program is for those people who own a BBC Micro and a Tandy CGP 115 Colour Graphic Printer and who need an adequate pound sign without resorting to a special graphic routine.

The important features are as follows. Line 10 enables the printer. Line 30 prints a left square bracket, back-spaces, prints an equal sign, back-spaces again and finally underlines.

The rest is for the lucky pools winner or dreamer only!

The final effect is a quite convincing pound sign.

```
LIST
   10 VDU2
   20 PRINT"" ONE MILLION POUNDS"''
   30 VDU1,91,08,61,08,95
   40 PRINT'1,000,000.00p'
   50 VDU3
>
```

```
RUN
'ONE MILLION POUNDS"
£1,000,000.00p
```

Pounds
by M J New

City Bomber

on Oric

This program was developed from an original version of the Vic20. The object of the game is to destroy the buildings before you are destroyed.

Every time you succeed in landing a flag will be displayed at the bottom of the screen. Additional points can be accrued by using as few bombs as possible.

There is a high score facility as well as full colour and sound effects.

Variables

H	Height of plane
X	Horizontal position of plane
Y	Vertical position
B	Set whilst bomb drops
S V	Horizontal fix. Vertical fix of bomb

Pokes

BC49 0 Sets foreground colour to black
BC99 7 Sets foreground colour to white
B7E8 B7E7 Stores graphic characters

PROGRAM OF THE WEEK

```
0 CLS:RESTORE:GOSUB1500
10 REM ####################
20 REM ##                ##
30 REM ##  CITY  BOMBER  ##
40 REM ##                ##
50 REM ## By P.M.Stracey ##
60 REM ##                ##
70 REM ####################
80 FORY=HTO20:FORX=1TO34:PLOTX,Y," ]"
90 IFSCRN(X+2,Y)<>32THENSOUND1,1,0:PLAY4,
   5,1,2000:GOTO 110
100 GOTO 120
110 FORE=YTO20:PLOTX+1,E," ":PLOTX+1,E,"^
   :PLOTX+1,E-1," ":NEXT:WAIT2:GOTO1000
120 IFB=1THENGOSUBBOMBS:GOTO150
130 IFB=2THEN GOSUB610:GOTO150
140 S=Y+1:V=X:K$=KEY$:WAIT7:IFK$<>""THEN
   PLAY1,0,7,0:CO=CO+1:GOSUB BOMBS
150 IFY=20ANDX=32 THENGOSUB LA
160 PLOTX,Y,"  ":NEXT X,Y
500 REM ##################
510 REM ## ---BOMBS--- ##
520 REM ##################
530 B=1:S=S+1:IFS>24THENB=0:RETURN
540 S1=(S*2)+ 90:SOUND1,S1,5
550 PLOTV,S,"_":PLOTV,S-1," "
560 IFSCRN(V,S+1)=127THENB=0:PLOTV,S," "
   :PLAY0,0,0,0:RETURN
570 IFSCRN(V,S+1<>32THENPLAY4,3,1,1000:
   GOTO590
580 RETURN
590 C1=C1+2
600 PLOTV,S," ":PLOTV,S+1," ":PLOTV,S+2,"
   ":PLAY0,0,0,0:GOSUBADD:B=2:RETURN
610 DL=DL-1:IFDL=0 THENB=0:DL=2:RETURN
620 WAIT9:RETURN
800 REM ###################
810 REM ## ---LANDED--- ##
820 REM ###################
830 H=H+1:ZX=ZX+1:PLOTZX,25,"!":POKE#BF91
   ,3:IFH>13THEN H=13
840 C3=C3+1:GOSUBADD:PLOTX,Y,"  ":IFCO
   <(P/2+11)THEN880
850 WAIT100:FORY=0TOHSTEP-2:FORX=1TO36:
   PLOTX,Y," ]"
860 NEXTX:PLOTX,Y,"  ":NEXTY:IFZX>
   37THENZX=1
870 GOSUB BUILDINGS:CO=0:RETURN
880 IFCO>INT(P/2)+2 THEN 930
890 POKE#BC49,0:PLOT12,4,"WELL DONE":POKE
   #BC99,7:POKE#BC9A,12:PLOT14,6,"EXTRA"
900 FORT=0TO600:PLOT8,8,"2000 BONUS
   POINTS":NEXT:PLOT8,8,"
910 POKE#BC49,5:POKE#BC99,5:POKE#BC9A,32:
   PLOT12,4,"             ":PLOT14,6,"     "
920 C4=C4+2:GOSUB ADD:CO=0:WAIT100:
   GOTO 850
930 FORT=0TO400:PLOT8,8,"1000 BONUS
   POINTS":NEXT:PLOT8,8,"
940 4=C4+1:GOSUB ADD:CO=0:WAIT100:GOTO 850
1000 REM ################
1010 REM ## CRASHED ETC ##
1020 REM ################
1030 WAIT120:PLAY0,0,0,0:GOSUB HIGH
1040 ZX=1:H=5:GOTO OPT
1200 REM #################
1210 REM ## SCORE TITLES ##
1220 REM #################
1230 POKE#BBB1,1
1240 FORD=#BBB2TO#BB8C:READDTA:POKED,DTA
   :NEXT
1250 FORD=#BB93TO#BBA1:READDTA:POKED,DTA
   :NEXT
1260 RETURN
1300 REM ################
1310 REM ## -SCORE ADD- ##
1320 REM ################
1330 REM
1340 IFC1>57THENC1=48:C2=C2+1
1350 IFC2>57THENC2=48:C3=C3+1
1360 IFC3>57THENC3=48:C4=C4+1
1370 IFC4>57THENC4=48:IFC5<48THENC5=48
   :C5=C+1
1380 POKE#BBDC,C1:POKE#BBDA,C2:POKE#BBD8,
   C3:POKE#BBD6,C4:POKE#BBD4,C5
1390 POKE#BBD3,0:RETURN
1490 REM ####################
1500 REM ## INITIALISATION ##
1505 REM ####################
1510 A=32:FORC=#BBA2TO#BBA7:POKEC,A:NEXT:
   OPT=2000:HELP=2200:Y=0:X=0
1520 H1=A:H2=A:H3=A:H4=A:H5=A:E$=" "+CHR$
   (27):POKE#BFB9,A:ZX=1
1530 INIT=1590:TITLES=1200:BOMBS=500:LA=
   800:H=5:POKE#BBD3,0:PRINT
1540 BUILDINGS=3000:ADD=1300:HIGH=1700:
   GRAPHICS=1900:MAIN=10:PAPER4:INK5
1550 PRINTCHR$(4);E$"@";E$"J CITY BOMBER";
   CHR$(4);CHR$(10);CHR$(10)
1560 PLOT8,20,"Written by P.M.Stracey":
   PLOT8,22,"Date: 17-APR-83":POKE618,14
1570 PRINTSPC(236)"INSTRUCTION"E$"L?":GETI
   $:IFI$="N"THEN1580ELSEGOSUB2200
1580 POKEBBA4,A:POKE#BBA5,A:POKE#BBA6,A:
   POKE#BBA7,A:GOSUBGR:GOSUBTITLES
1590 C1=48:C2=48:C3=48:C4=48:C5=32:CLS:M=
   FRE(""):S=0:V=0:B=0:DL=3
1600 POKE#BBDC,C1:POKE#BBDA,C2:POKE#BBD8,
   C3:POKE#BBD6,C4:POKE#BBD4,C5
1610 POKE#BBF0,H1:POKE#BBEE,H2:POKE#BBEC,
   H3:POKE#BBEA,H4:POKE#BBE8,H5:CO=0
1620 GOSUB BUILDINGS:GOSUB ADD
1630 RETURN
1640 GOTOMAIN
1700 REM ################
1710 REM ## HIGH SCORE ##
1715 REM ################
1720 U$=CHR$(H5)+CHR$(H4)+CHR$(H3)+CHR$
   (H2)+CHR$(H1)
1730 T$=CHR$(C5)+CHR$(C4)+CHR$(C3)+CHR$
```

```
     (C2)+CHR$(C1)
1740 IF T$)U$ THEN 1750 ELSE RETURN
1750 H1=C1:H2=C2:H3=C3:H4=C4:H5=C5
1760 POKE#BBF0,H1:POKE#BBEE,H2:POKE#BBEC,
     H3:POKE#BBEA,H4:POKE#BBE8,H5
1770 PRINTCHR$(10);CHR$(10);CHR$(10);
     CHR$(17)
1780 INPUT" Enter your name upto SIX
     characters    long  :- ";K$:Y=0:
     PRINTCHR$(17)
1790 I$=" "+K$:IFLEN(I$))7THEN1750
1800 FORI=1TOLEN(I$):Y=Y+1:S=ASC(MID$(I$,
     I,1)):POKE#BBA0+Y,S:NEXT
1810 Y=0:RETURN
1890 REM ##############
1900 REM ## GRAPHICS ##
1905 REM ##############
1910 FORD=#B6D8TO#B6FF
1920 READ DTA:POKED,DTA:NEXT: FORD=#B7E0T
     O#B7E7:READDTA:POKED,DTA:NEXT:RETURN
1930 DATA 45,63,45,63,45,63,45,63
1940 DATA 0,12,30,63,45,63,45,63'ROOF
1950 DATA 0,0,0,31,4,46,63,4 'PLANE
1960 DATA 0,0,0,14,21,46,63,4'BROKEN
1970 DATA 0,0,0,8,8,0,0,0      'MISSILE
1975 DATA 28,30,31,30,28,16,16,16'FLAG
1980 DATA 89,79,85,82,32,32,83,67,79,82,
     69 'YOUR SCORE
1990 DATA 72,73,71,72,32,32,83,6,79,82,69,
     32,65,121,32 'HIGH SCORE
2000 REN #############
2008 REM ## OPTIONS ##
2020 REM #############
2030 PRINTCHR$(12);CHR$(10);CHR$(10):E$="
     "+CHR$(27)
2040 PRINTSPC(10);E$"AOPTIONS";CHR$(10)
2050 PRINTE$"B Do you want another game"
     E$"L?"
2060 GETK$:IFK$="N"ORK$="n"THEN PRINTCHR$
     (12):CALL#F420
2070 GOSUB INIT:GOTO MAIN
2200 REN ##################
2210 REM ## INSTRUCTIONS ##
2220 REM ##################
2230 CLS:E$=" "+CHR$(27):PRINTCHR$(10)
2240 PRINTSPC(11);E$"AINSTUCTIONS";SPC(27)
     ;"------------";CHR$(10);CHR$(10)
2250 PRINTE$"BThe aim of this game is to
     bomb"
2260 PRINTE$"Bthe city without crashing
     into the"
2270 PRINTE$"Bbuildings.";CHR$(10)
2280 PRINTE$"BYou can use ANY KEY to drop
     your"
2290 PRINTE$"Bbombs.";CHR$(10)
2300 PRINTE$"BYou will get BONUS POINTS
     if you"
2310 PRINTE$"Bmanage to destroy the
     buildings"
2320 PRINTE$"Bby uing the least amount of
     bombs.";CHR$(1)
2330 PRINTSPC(10);E$"L";E$"EGOOD LUCK!";
     CHR$(10);CHR$(10)
2340 PRINTSPC(2);CHR$(10);CHR$(10);E$"T"
     ;E$"BPRESS ANY KEY TO CONTINUE"
2350 GETK$:IFK$()""THENRETURN
3000 REM ###############
3010 REM ## BUILDINGS ##
3020 REM ###############
3030 P=0:T=21:REPEAT
3040 FORI=1TO34:PLOTI,T,127:NEXT:T=T+1:
     UNTILT=24
3050 POKE#BEF1,2:POKE#BF19,2:POKE#BF40,2
3050 FORF=4TO30 STEP2
3070 FORG=20TO20-((RND(1)*(0.5+6)))STEP-1
3080 PLOTF,G,91:P=P+1:NEXT:PLOTF,G,92:
     NEXT:P=P+14:RETURN
```

City Bomber
by P Stracey

Daya

on ZX81

This is an educational program for all the tiny tots who get big ideas about computers and galactic invaders and need to be brought back down to earth — it asks for a number between 1 and 7 and then tells the user which day of the week that number refers to — ie Day 1 is Monday etc

```
5 REM DAY OF THE WEEK
10 DIMD$(7)
15 D$(1)="MONDAY"
20 D$(2)="TUESDAY"
30 D$(3)="WEDNESDAY"
40 D$(4)="THURSDAY"
50 D$(5)="FRIDAY"
60 D$(6)="SATURDAY"
70 D$(7)="SUNDAY"
80 PRINT"TYPE IN A NUMBER BETWEEN 1 AND 7"
90 INPUTZ
100 IF Z<1 OR Z>7 OR Z<>INT(Z) THENGOTO 80
110 PRINT"DAY ";Z;" OF THE WEEK"
120 PRINT"IS CALLED ";D$(Z)
130 PRINT
140 PRINT
150 PAUSE 100
160 RUN
READY.
```

Days
by M Valentine

Galactic Intruder

on Atari

This program puts you in charge of a missile base armed with ten shots. An animated invader moves across the screen moving downwards.

Each time you hit the invader your score will increase by ten, but beware — one hit from the invader is lethal.

```
10 REM * GALACTIC INTRUDER by STEVEN MAC
ILHEE member of the M.A.C.C *
20 DATA 16,56,124,254,254
30 DATA 60,126,90,255,165,153,165,165
40 DATA 60,126,108,255,165,153,90,90
50 REM *LINE 20 IS DATA FOR MISSILE BASE
.LINE 30-40 ARE DATA FOR THE TWO POSITIO
NS OF THE INVADER FOR ANIMATION*
60 X0=100:X1=60:REM * HORIZONTAL POSITIO
NS FOR BOTH P/M
100 GRAPHICS 7:B=70:DIF=1:SCORE=0:SHOTS=
10:SOUND 1,0,0,0:TP=30:POKE 752,1:REM *
SET VARIABLES AND GRAPHICS MODE *
110 POKE 704,88:POKE 705,200:REM * THE C
OLOURS FOR BOTH P/M *
120 A=PEEK(106)-24:REM * 'A' IS RAMTOP
130 POKE 54279,A:MYPMBASE=256*A:POKE 559
,46:POKE 53277,3:REM * 'MYPMBASE' FINDS
PAGE NUMBER TO STORE P/M *
140 HOZ0=53248:HOZ1=53249
150 FOR I=MYPMBASE+384 TO MYPMBASE+1024:
POKE I,0:NEXT I:REM * CLEARS P/M RAM *
160 FOR I=MYPMBASE+603 TO MYPMBASE+607:R
EAD D:POKE I,D:NEXT I
170 FOR I=MYPMBASE+670 TO MYPMBASE+677:R
EAD D:POKE I,D:NEXT I
200 POKE HOZ0,X0:POKE HOZ1,X1:REM * HORI
ZONTAL POSITIONS FOR BOTH P/M *
205 IF INFIRE=1 THEN GOTO 210:REM * MAKE
S INVADERS BULLET GO STRAIGHT *
207 INSHOT=X1-45
210 SOUND 1,122,10,8
215 GOSUB 2000:REM * KEEP TRACK ON SCORE
 AND SHOTS *
220 IF SHOTS=0 THEN GOTO 6000
300 IF BFIRE=1 THEN GOTO 330:REM * MAKES
 BASES BULLET GO STRAIGHT *
310 BSHOT=X0-45
330 IF STICK(0)=7 AND X0<190 THEN XB=X0+
3
340 IF STICK(0)=11 AND X0>60 THEN X0=X0-
7
350 IF STRIG(0)=0 THEN BFIRE=1
355 IF X1 =215 THEN X1=35:REM * PUT INVA
DER ON THE LEFT OF THE SCREEN WHEN IS GO
ES OF THE RIGHT *
360 IF BFIRE=1 THEN GOSUB 1000
361 IF TP>=94 THEN INFIRE=0
362 INFIRE=0
363 IF X1>60 AND X1<185 THEN INFIRE=1:RE
M * 363-365 MAKES SHORE THAT THE INVADER
 DOSN'T FIRE WHEN OF THE SCREEN *
364 IF H=1 THEN GOTO 366
365 IF INFIRE=0 THEN COLOR 0:PLOT INSHOT
,5:DRAWTO INSHOT,90:H=H+1
366 IF INFIRE=1 THEN GOSUB 4000
370 X1=X1+DIF:IF D=90 THEN RESTORE 30
375 SOUND 1,0,0,0
380 GOTO 170
1000 REM * ROUTINE FOR BASES BULLET *
1010 COLOR 1
1020 PLOT BSHOT,B:DRAWTO BSHOT,B-3:REM *
 DRAW BULLET *
1030 B=B-4:REM * MAKE BULLET GO UP
1040 COLOR 0
1050 PLOT BSHOT,80:DRAWTO BSHOT,B+5:REM
* BLANK OUT TRAIL *
1060 IF B<=6 THEN COLOR 0:PLOT BSHOT,80:
DRAWTO BSHOT,3:BFIRE=0:B=70:SHOTS=SHOTS-
1:REM * END OF BULLET *
1070 IF PEEK(53253)<>0 THEN GOSUB 3000:R
EM * CHECK FOR COLLISION WITH BASE TO BU
LLET *
1080 RETURN
2000 REM * SCORE *
2010 POKE 656,1:? "SCORE=";SCORE,"SHOTS
LEFT=";SHOTS;" "
2020 RETURN
3000 REM * INVADER HAS BEEN SHOT *
3010 FOR CS=0 TO 200 STEP 4:SOUND 1,CS,8
,8:POKE 705,CS:NEXT CS:POKE 705,200:SOUN
D 1,0,0,0:SCORE=SCORE+10
3015 DIF=DIF+1:REM * INCREASE DIFFICULTY
 TO MAKE INVADER MOVE FASTER *
3030 COLOR 0:PLOT BSHOT,70:DRAWTO BSHOT,
0:BFIRE=0:B=70:SHOTS=SHOTS-1:REM * END O
F BULLET *
3040 POKE 53278,0:REM * CLEARS COLLISION
 REGISTER *
4000 REM * INVADERS SHOT *
4010 COLOR 1:PLOT INSHOT,TP:DRAWTO INSHO
T,TP-3
4015 TP=TP+4
4020 COLOR 0:PLOT INSHOT,15:DRAWTO INSHO
T,TP-8:H=0
4025 IF PEEK(53252)<>0 THEN GOSUB 5000
4030 IF TP>=80 THEN COLOR 0:PLOT INSHOT,
15:DRAWTO INSHOT,85:TP=30:INFIRE=0
4040 RETURN
5000 REM * BASE HAS BEEN SHOT
5010 POKE 704,222
5015 FOR LQ=0 TO 60
5020 FOR SO=10 TO 50:SOUND 1,SO,6,10:IF
SO>40 THEN SO=10:NEXT SO
5025 NEXT LQ
5027 COLOR 0:PLOT INSHOT,10:DRAWTO INSHO
T,90
5030 SOUND 1,0,0,0
5040 GOTO 6000
6000 REM * END ROUTINE *
6005 ? "}":REM TO DO THE ARROW PRESS THE
 'ESC' KEY THEN PUT YOUR FINGER ON THE '
CTRL' AND PRESS THE 'CLEAR' KEY
6010 POKE 656,1:? "         PRESS START T
O BEGIN":SOUND 1,0,0,0:POKE 53278,0
6011 IF SCORE>HIGH THEN HIGH=SCORE
6012 POKE 656,2:? "                 HIGH SCO
RE=",HIGH
6013 COLOR 0:PLOT INSHOT,5:DRAWTO INSHOT
,90:PLOT BSHOT,5:DRAWTO BSHOT,90:REM * C
LEARS BULLETS *
6014 POKE 656,3:? "by STEVEN MACILHEE me
mber of M.A.C.C"
6020 IF PEEK(53279)=6 THEN RUN
6030 GOTO 6020
```

Galactic Intruder
by Steven Macilwee

WIN THE POOLS?

(48k)

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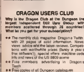
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(But THE best sellers are still 'Pimania' and 'Ring of Darkness'.)

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OPEN FORUM

3-D View

on BBC

This program draws a three-dimensional surface. Interesting results can be obtained by changing the function in line 80 or the vertical scaling in line 90.

Variables

XS Horizontal step
YS Vertical step
A ½ of horizontal co-ordinates range
C ½ of vertical co-ordinate range

```
 10 MODE0:VDU29,640;512,:XS=2:YS=4
 20 A=640:B=A*A:C=512
 30 FORX=0 TO A STEPXS:S=X*X:P=SQR
(B-S)
 50 FORI=-P TO P STEP6*YS
 70 R=SQR(S+I*I)/A
 80 Q=(R-1)*SIN(24*R)
 90 Y=I/3+Q*C
 95 IF I=-P:M=Y:GOTO110
100 IF Y>M:M=Y:GOTO130
105 IF Y>=N GOTO140
110 N=Y
130 PLOT69, X,Y:PLOT69,-X,Y
140 NEXT:NEXT
150 END
>
```

3-D View
by Justin Keely

MICRO RADIO

This is the first in a series of articles designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered, write to Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD

GW6JJN

With two or three million home computers in the UK, it is reasonable to assume that microcomputing as a hobby is here to stay. An older, but equally hi-tech hobby, is amateur radio and short wave listening (SWL). When citizens band radio was made legal two years ago, the number of people with radio equipment soared into the millions.

Radio and computers complement each other in so many ways that it was obvious that many radio enthusiasts would turn to the home computer to enhance their hobby. With the possibilities of networking and the transmission of programs and data over noise-free amateur radio frequencies, computer enthusiasts will hopefully turn to amateur radio to enhance their interests.

The purpose of this column is to provide a forum for those interested in radio and computing. It is also hoped to be an introduction to radio and the exciting world of satellites and moonbounce — making sense of all of those strange noises that can be heard on a radio receiver.

In this column we shall discover how to track the moon and plot the course of the space shuttle. We shall make sense of amateur and information satellites and find out how to send amateur television on a microcomputer.

As I have said, the column is in the style of a forum for you to send in your ideas, your questions and your routines. I shall be looking at morse code, RTTY, satellites and even the possibilities of sending your own personal teletext pages to your friends. There will be reviews of relevant software, hardware and books. There will be information about radio-computing user groups and much much more. This is the column that will take you and your computer into the space age. See you next week on this frequency. ■

Ray Berry GW6JJN

...is left may be a corridor, to his right a wall and before him, a door. He can't, of course, go to the right, but he may choose to go left along the corridor, in which case the screen will clear, and the player find himself at the next location. Should he choose to go forward to the door, he (or she) will be given the choice to either open the door or listen at the door.

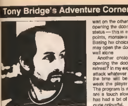
The first option is for the brave or foolhardy — the more cautious go for the second option, in which case the player will be given information about what lies in

(3) Brian Foote, who reckons his 97.5 percent is a record. Apart from the odd rogue 215 percent, I think he may be right (unless *you* know better), and he included a data tape to prove it.
(4) George Findley
(5) Christopher Kenworthy
(6) Bret Sampson, who then wrote 83 after his name — whether this is an allusion to his age, or the year, I know not!
(7) Russell Lewins, who had to work very hard!
(8) Tony Aspinall

stuck.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD

Tony Bridge's Adventure Corner



Hall of fame

Another look at recent Spectrum adventures with a trio of programs from ASP Software The same people you may remember publish a well known old-established monthly computer magazine as well as *The Valley* for which I still have a soft spot The first *Detective* is really not an adventure, but a cerebral game, with its basis in *Cluedo* It is very colourful, and can be played by 1 to 6 players The mechanics of play are quite simple — dice are thrown and the players move around a small 3 x 3 area picking up clues as to the scene of the crime the perpetrator the murder weapon, and the motive

In *Mastermind* fashion the information is put together, and a process of elimination should, in the end, reveal all the answers A good program for the kids

The second tape I have from ASP is *Cells* This is from the *Wumpus* branch of adventure, in which the player moves around a Dungeon complex usually listening at doors for monsters and picking up gold pieces and other treasure In the original *Wumpus* all the player had to do was to triangulate on the Wumpus a mythical monster with the aid of tactile clues as to his whereabouts Later versions allowed the player to flash a torch before him to discover what was in the neighbouring rooms or fire an arrow to clear a path

Now the details have become ever more distanced from the original — first published as far as I know by David Ahl's *Creative Computing* magazine back in 1980 or thereabouts

In the present game the player is presented at each turn with the layout of neighbouring locations So for instance to his left may be a corridor to his right a wall and before him a door He can't of course go to the right but he may choose to go left along the corridor in which case the screen will clear and the player find himself at the next location Should he choose to go forward to the door he (or she) will be given the choice to either open the door, or listen at the door

The first option is for the brave or foolhardy — the more cautious go for the second option in which case the player will be given information about what lies in wait on the other side of the door. Before opening the door he may see his present status — this is a table of treasure held hit points, monsters slain so far and so on Basing his choice on this table the player may open the door and do battle or leave well alone

Another choice awaits the player on opening the door, and this is — fight or retreat? In my experience, the monster will attack whatever is decided and much of the time will be beaten, no matter how weak the player is (could be pure luck) The program is in Basic, so the responses are a touch slow but the screen display has had a bit of thought put into it and is quite colourful.

The last ASP program is *Demon Knight* This is a text adventure in the traditional mould Again in Basic (incidentally I certainly don't hold with the idea that Basic games are not worth looking at — a well-written Basic program should suffice for a text adventure) This program, however is very badly presented being full of elementary spelling mistakes that ought to have been found out by the game-testing stage The text is badly justified and the screen layouts are generally messy The player is even asked to set the *Caps Lock* before playing! Have a *Peek* at 23658 some day, fellows!

The adventure itself is set in a castle, and is the usual mix 'You are in the Throne Room — you see ' etc Only two word commands are accepted, although *Help* will elicit a response No doubt the inherent puzzles (how to get to the secret of the rubbish pile and so on) are diverting but the incorrigible cheat can easily break into the program, and find many of the answers displayed

All in all, not a very exciting release from ASP and they all have the flavour of old ZX81 games — the three programs together on a compendium tape would be good value, however

On to The Hobbit Hall Of Fame, and there are quite a few new names to be blasoned on the shield

(1) John Zimmerman

(2) Alan King (aged 41, he tells me) Alan's copy of *The Hobbit* is now fighting back in retaliation for being solved! Perfectly behaved until Alan cracked it, the program has since crashed about half of the time usually when climbing into the Barrel (but see later Alan) stings Alan to death in previously safe places, transfers him from dungeon to dungeon and so on

(3) Brian Foote who reckons his 97 5 percent is a record Apart from the odd, rogue 215 percent I think he may be right (unless *you* know better), and he included a data tape to prove it

(4) George Findlay

(5) Christopher Kenworthy

(6) Bret Sampson who then wrote 83 after his name — whether this is an allusion to his age, or the year, I know not!

(7) Russell Lewins who had to work very hard!

(8) Tony Aspinall

(9) Bilbo Baggins of Guernsey So that's where he is now, he seems to get all over the place! He has sent me a complete solution to the program, and all on one sheet of paper too — 85 feet long! Bilbo has done the whole thing in just 50 moves and says that some (and rather like speeding through Paradise on a motorway!) eight of these may be omitted — surely a record?

(10) Justin Scharvona, who offers a way of overcoming the tendency for the program to crash when climbing into the barrel — *OWJAUIMTPFOONRTBOUBTALRER RETL* and then type *OJBUAMR PROENLT* If you haven't seen this code before start at the second letter of each sentence, then read off every other letter When you reach the end return to the first letter, and repeat the process

Justin reckons incidentally that a Polaroid camera would help in recording Hi scores achieved in arcade games (see my comment of a couple of weeks ago) — but the software houses ought to provide the facility

I agree however with his views on *Manic Miner* — certainly the best arcade game around for the Spectrum

(11) Martin Jones jointly with Andrew Sweetland, who like one or two others has noticed *Hobbitbug No 233* If you enter *"EN DO"* the Black River evaporates, Gollum dies and the Sword breaks — not bad for two little words eh?

(12) Steven Martin

(13) Alan McDonald, who has also solved *Golden Apple*, the new Artic adventure, which took him all of three days (must have been difficult — Adventure C took him a morning!) His friend, Chun Nok Fung, would like it known that he has finally managed to get through the Green Door — with a little help from Gandalf!

(14) Ian Morse

(15) Paul Catterfeld

(16) P Macy, who managed to drown Gandalf in the process!

(17) John Parker

(18) M Bannon

I only have room left now for grovel I have had pointed out to me by several better adventurers than myself that the coin in the lake in Artic's *Planet of Death* and the computer are not red herrings I'm glad about this as it took me ages to get that coin! Try this (with our decoding procedure mentioned earlier) *EUG SUEACRODIINNTPORBIRS IOBN* and ask the computer *HTEYLPPE* if you're stuck ■

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So, if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge Adventure Corner *Popular Computing Weekly* 12 13 Little Newport Street, London WC2R 3LD



LEFT TO RIGHT

Justin Fackrell, of Caswell Drive, Caswell, Swansea, writes

Q **Please can you help me? I have recently been writing some games for my BBC micro I have learned to *Scroll* the screen up and down for *Asteroids* type games but I cannot *Scroll* from left to right, or right to left. Is it possible?**

A What you need to do is use *VDU 23* to access the 6845 screen chip directly, using registers 12 and 13 Because the computer only has to change these two registers, you can have some very fast *Scrolling*, and you get the effect of screen wrap-around by setting the start of the screen memory higher than its normal starting position

TOKENISED INPUTS

Hugh Geddis of Grange Farm Road, Maryport writes

Q **A few weeks ago you mentioned tokenised inputs for the Vic20 I recently got a Vic20 for my birthday, and would like to know what tokenised inputs do.**

A This is in your manual on page 133, appendix D, 'abbreviations for basic keywords' It is a shorthand form of entering commands

The Vic stores its Basic words at a series of addresses in the memory Instead of printing the entire word, we can use the token or abbreviation Terry Wallbridge, a reader who wrote to me a few weeks ago supplies this example

```
100 PRINT TEST' POKE 127
    PEEK (345) IF I - 9 THEN
    RESTORE GOSUB 10 PRINT
    AS POKE 1 PEEK (2335) AND
120 GOSUB 20 PRINT W$
    NEXT I NEXTR LET Q = 9
```

If you tried to enter this as part of a progsam it would be far too long (I have added a couple of extra spaces for clarity, but even without these it would be too long to be accepted on to the Vic screen display) However, if you try entering the following you will be left with a screen line of 83 characters, which is acceptable to the Vic All the shifted characters are in italics

```
100? TEST' PO 127 PE (345) IFI
     = 9 THRES GOS10 ? AS
     PO1 PE (2335) AN 120 GOS
     30 ?W$ NEI R Q = 9
```

After I pointed out the difficulty of getting upgrades for the issue 1 Spectrum, Paul Rason of Delta Research phoned me to say that his company specialises in just this upgrade It comes on a single board and costs £33 inclusive. Also included is a diagnostic tape to check the RAM

Delta Research is at 13 Church Street, Basingstoke, Hants RG21 1QG

If you want to telephone, the number is (0635) 45373

COMPUTER ADVICE

A Simmons of Botley Road, Botley Chesham, Bucks, writes

Q **I am the owner of a TI/99/4a, and am fortunate enough to be starting computer studies at school later this year I am a keen programmer, but I would be grateful if you could give me some advice as to whether I should keep my computer and add peripherals (which are expensive), or whether it would be better to buy a different computer (no more than £200)**

A I do not normally give direct advice about buying computers, because features of the various models are most important to you However, there are some things you might wish to consider

For the O-Level syllabus you really need a printer, with a TI/99/4a It will cost about £130 to get the motherboard extension unit and another £100 at least to get an RS232 interface to run it (assuming that your school or a friend has one) For that much money it might be better to look at a 48K Spectrum or One, both of which have their own printer

The other thing about the TI/99/4a is that its Basic is different from that used by the most common school computers It could be useful to talk to your computer teacher and find out what machine(s) you will be using in class

UP FOR SALE

Craig Shortland of James Street Earl Shilton, Leicester, writes

Q **Is it in order for me to convert a program for use on another computer and then offer it for sale? Or would I need prior pecmission of the author?**

Secondly, could you tell me the equivalent of *Left$*, *Right$* and *Mid$* on the Spectrum.

A I suggest you look at our 1-7 September issue On the front page we ran a story about the injunction that Century Electronics gained against Superior Software on the grounds of infringing copyright

The whole question of copyright is still shrouded in mystery, with no one exactly sure just how the law affects computer programs However I think it would be polite to contact the author first

As to your second question, the Spectrum uses the command *To* for splitting strings

ITALIAN TV

P Morrow of Derynorton Drive, Greenford, Middx writes

Q **My company will be sending me abroad soon for three years Can you tell me if my 48K Spectrum will work on the Italian television system? I still have my ZX81 (16K), would that work too?**

Another question concerns the Microdrive Will it be possible to record on Microdrive a program that is already on cassette? (Mind you, I shall not bother to get a Microdrive until the first million faulty ones have been returned. I have had enough trouble with my Spectrum already!)

A Most of western Europe is 625 line, 8 MHz, FM UHF as are we (The exception being France) Because of this it should be possible to use your Spectrum in Italy Problems might occur if you tried to play sound through your television as well There is a half MHz difference in both the vision bandwidth and the sound vision spacing This would make it difficult for both sound and vision to be tuned together The same applies to your ZX81

You can transfer a program from tape on to the Microdrive It is a question of simply loading the program into the memory of the computer and then simply Saveing it into the Microdrive Your scepticism about the Microdrive is shared by many not surprising given the problems with the early Spectrums Conversely the Microdrive is cheap, ingenious and unique and I am sure that demand will exceed supply for many months to come

---

Dennis Hutchinson of Melbourne Close Middlesbrough has written to tell me of a simple way of replacing a lost header on Spectrum programs

He used another program on tape that was at least the length of the one he wanted to add the header to This was *Loaded* as normal, but as soon as the header was *Loaded*, he pulled the ear-plug out Next, he put the program without a header into the tape recorder and wound to the start of the program, pushed the ear plug back in and the computer was fooled into *Loading* the program

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ZX81 16K for £60 including games and tape recorder Tel Crayford 529325 after 4 30

16K ZX81, OK'Tronica keyboard desk consul tape recorder high resolution dozens of books and magazines Many tapes including Black Crystal Adventures Arcade games All manuals £95 ono Tel 628-0806

ZX81 plus 16K plus OK Tronics keyboard and case Ten games tapes and other software magazines and manual £70 ono Tel 0642 563637

ZX81 (16K) Sinclair-built OK'Tronics keyboard printer save load switch over £100 of software one machine book. Cost over £300 will sell for £100 Tel Paul 722 7425 after 6 pm

Commodores for sale

COMMODORE 64 + cassette + joystick + software + magazines £200 Tel 01 251 3769 after 6 pm

VIC20 + cassette recorder + 8K expansion + joystick + 3 games and 4 education packs Vic revealed Reference guide 1 year guarantee £150 Tel 821 0147 after 6 pm

VIC20 + C2N cassette + introduction to Basic part 1 + joystick + Gorf and Jelly Monster cartridges + £50 worth of magazines and £50 worth of software Still under 9 months guarantee Fully boxed with manual worth £300 sell for £100 or £80 ono Tel 388 0639 after 5 pm

VIC20 cassette deck 8K Ram expansion and super expander Many magazines really £100 worth of software All worth £360 sell for £165 Tel 0279 37826

VIC20 cassette unit, 3K, 8K and 16K Ram pack + joystick + £1 000 worth of software + books and magazines £300 Tel 041 5571533

PET COMMODORE replacement Ram chips normally £15 a bargain at £5 each Tel 0742 483587 after 6 pm

VIC20 + cassette deck + programmer's aid + machine code monitor + 3K 8K and 16K Ram packs with joystick and paddle + 4 cartridges + £130 worth software Introductory to Basic parts 1 and 2 Vic revealed + programmer's reference guide £160 Tel 892 8768 Under guarantee

Acorns for sale

BBC Model B 1 2.05 pass 5 Acornsoft tapes for program power two Bugbyte and three others Seven months old £420 ono Tel Newcastle (0632) 737854 anytime

ACORN DISK DRIVE. 100K storage hardly used, plus manual and spare disks, £130 plus Acornsoft view Rom Still boxed £30 Tel 0344 886178

BBC B 1.2OS. Ten months guarantee Prestel Micronet plus acoustic modem Basic course with tapes one year Acorn user £365 ono Tel 03045 5793

BBC 'A' OR "B" WANTED In good unmodified condition Tel Jim 0202 516828

SWAP/SELL BBC SOFTWARE Quicksilva, Wizard Salamander Dragon Rider Asp Valley P Power Killer Gorilla Superior Alien Dropout, Virgin Landfall £3 each Also others Tel Bourne End 23544 ask for Malcolm

Dragons for sale

DRAGON 32, two months old joystick, light pen + Dragon books £240 ono Tel Newcastle 862626 after 5 30 pm

DRAGON 32, two months old joystick £50 software + books 100+ magazines including Dragon User 100+ listings programs proven cassette recorder blank cassettes 20in and tv £225 ono Tel 0906 816840

DRAGON USER, issue one to four £1 50. Microdeal game software music composer £8 Shuttle Flight, £4 Tel Gravesend 64608

DRAGON 32, excellent condition complete with manuals leads joystick, magazines + lots of software and tape recorder total value £1 280 O A N O over £220 considered Tel 0532 687964

SELL OR SWAP DRAGON 32, 1 year guarantee with books, games joysticks magazines etc £175 ono or swap for BBC A/B + £200 Tel Harlow 0297 30685

DRAGON 32 + joysticks + £80 worth of software, £165 Tel 237 6222 (after 6 pm) daytime 01 928 6580 (Stacy)

DRAGON 32, swap for Spectrum 48K (issue 2) two months old software joysticks Tel Stanford Le Hope (0375) 672031

DRAGON 32, still boxed, all leads etc + cassette deck + joystick + over £140 of software mostly arcade games + books worth over £340 all together sell for £230 ono Tel Hengoed 816071

DRAGON 32, boxed one month old cassette recorder + some software, manual leads, £180 ono Tel Leighton Buzzard (0525) 379862 after 7 pm

Ataris for sale

ATARI VCS paddles + joysticks 5 cartridges including Space Invaders and Asteroids, £80 ono Tel 01 237 7555

ATARI CONSUL + 11 cartridges for sale £150 or exchange for Vic20 software Tel Southend 0702 710246 daytime

SWAP ATARI 800 with Basic and new colour Genie both 16K, with manuals for 48K Atari 800 still under guarantee Tel 06285 20165

ATARI 400 48K, + Triaktutorics 1-6 Invitation to Programming part 1 and 2, cassette drive cartridges cassettes 2 joysticks manuals £400 ono Tel Southend (0702) 63332.

ATARI VCS two cartridges for £80 ono Tel 01-328 9075

ADVENTURE HELPLINE

Micro *48K Spectrum*
Adventure *Inca's Curse*
Problem *How do I open the porthole in the sand dungeon and what do I need to take with me when (or if!) I go?*
Name *David Skipsey*
Address *12 Alexandra Drive Rock Ferry Birkenhead Merseyside L42 4PU*

Micro *ZX Spectrum*
Adventure *Planet of Death*
Problem *Getting past room with loudspeaker and force field*
Name *Graham Hastie*
Address *4A Green Drive Inverness IV2 4EX*

Micro *ZX Spectrum (48K)*
Adventure *Artic's Espionage Island*
Problem *I cannot get past the tank (despite having plastic explosive and a power source with which to detonate it)*
Name *Roderick MacLachlan*
Address *1 Craig Road Workington Cumbria CA14 3JU*

Micro *Spectrum 16K*
Adventure *Time line (Gilsoft)*
Problem *Have reached grandfather clock but I am unable to do anything at all with it*
Name *Matthew Mason*
Address *13 Beaufort Close Sampford Peverell Tiverton Devon*

Micro *ZX Spectrum*
Adventure *The Knight's Quest*
Problem *In the deserted wasteland I can never find the exit I know the method is to drop things search and then pick them up again but it never works PS I have the compass*
Name *Mark Fairclough*
Address *54 Eccleston Road West Ealing London W13*

Micro *48K ZX Spectrum*
Adventure *The Hobbit*
Problem *How to cope with Butlers and Goblins who keep on capturing me and throwing me back into dungeons!*
Name *Greg Turnbull*
Address *29 Rockville Fulwell Sunderland Tyne and Wear SR6 9EL*

ELEPHANTS



Steeple Jack is an infuriating new arcade game for the Atari Your seemingly simple task is to send Jack climbing higher and higher up a series of chimneys

Occasionally Jack is thwarted in his climb by a break in the ladder and he must jump to another nearby The problem is that someone is dropping various strange objects on top of him — elephants for example

Needless to say Jack must avoid such hazards, while still trying to rise as high as possible up into the stratosphere

Program *Steeple Jack*
Price *£14 95*
Micro *Atari (16K5Disc)*
Supplier *English Software*
Box 43
Manchester
M60 1BW

SECRET CODE

Quick as a flash comes *Computer War* in which you must destroy incoming missiles by cracking a secret code before world obliteration follows — remind you of anything? After the movie and the book comes the game based on *War Games*

The plot of the game closely follows that of the film — you must first gain entry to the battle computer by cracking a secret code then you must track the simulated enemy missiles and finally destroy them in a duel to the thermo nuclear death

Being cartridge based, this must be one of the few epic games to be announced recently that you won t be able to run on your Spectrum despite Thorn s moves in that direction

Program *Computer War*
Price *Atari/Texas £28 (average)*
Vic20 £20 (average)
Micro *Atari/Texas*
T199 4a/Vic20
Supplier *Retail Thorn EMI*
Thorn EMI House
Upper St Martin s Lane
London WC2H 9ED

CARTOON

And still they keep on coming Hyperion Software is yet another new company selling Spectrum software

In *Roadracer*, you are a coyote desperately trying to catch a road runner

The program sticks quite closely to the sublime cartoons — in the first screen you try to drop an anvil on the bird as it moves past — if you miss, the anvil bounces on the ground and comes up to flatten you Squashing the roadrunner gets you on to the next screen, where you stand on top of a cliff with the anvil waiting to swing it down and so on

It's a great idea (always was) and graphically the game is not bad but the whole thing is spoilt (except for very young children perhaps) by being almost entirely in Basic This means that movements are very clumsy indeed — the coyote moves as though he were on wheels with his feet tied together

More time and trouble over the animation plus a few machine code splats, could have made the game a winner Still I suppose young children might as with the cartoon, be entertained by the coyote's inevitable and violent demise

Program *Roadracer*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *Hyperion Software*
145 Hanover Street
Swansea SA1 6BR

MONOPOLY

Twelve games is a fairly sizable way to launch yourself on to the software market

Temptation Software comes in a rather interesting cassette box with a silvery cover and a cut out section showing the actual game illustration

Of the 12 titles, one of the most welcome will be *Micropoly* which allows you to play monopoly on your Vic or Dragon with the computer acting as board and banker

In an unusual move both versions are on one cassette The Vic version requires 16K

Program *Micropoly*
Price *£5 95*
Micro *Vic20/Dragon 32*
Supplier *Temptation Software*
27 Cinque Ports Street
Rye
East Sussex

SIMPLETON

Quest is an adventure game that seems to include just about every feature of every adventure game you've ever heard of Taking the role of either wizard, cleric, rogue, fighter or simpleton (does anyone ever choose simpleton?), each with their own strengths and weaknesses you must locate a special map

On your way you will meet dozens of gruesome monsters whom you will have to fight for treasure or simply to continue on your quest The victor is decided by a complex comparison of combat points, weapons, defence and, of course luck

The press release on this game gives a number of helpful clues in playing the game For example, when you start you should go (we're not having that — the Elf Most High)

Program *Quest*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *Hewson Consultants*
60A St Mary s Street
Wallingford
Oxfordshire OX10 0EL

FILED

The latest addition to Kenema's range of serious packages for the Oric is *Oric Filestar*

The program which is roughly equivalent to *Vu-File* on the Spectrum, enables you to use your computer as a filing system For example, if you have a list of names and addresses and all you know about someone is the name of their street, the computer should be able to find the file given only this information

The program comes with a manual which illustrates how to use the chief feature of the program

Program *Oric Filestar*
Price *£12 00*
Micro *Oric 1 (48K)*
Supplier *Kenema Associates*
1 Marlborough Drive
Worle Avon
BS22 0DQ

GHOSTLY

Texas owners must be grateful for all the software they can get since the machine is short of good programs from independent suppliers

Stainless Software offers nothing but Texas Instruments, programs for both the Basic and enhanced machines *Zombie Mambo* is a two program pack containing a creepy maze/chase game

In the first section you must dig up three keys hidden in the graves Should you pick an inhabited grave, its recently deceased occupant will come after you — you must avoid his touch

Having found the keys you will be able to enter the labyrinth in part 2 Here you find your way around the vaults looking for treasure and avoiding more monsters Finally, you have to find your way out

Program *Zombie Mambo*
Price *£15 00*
Micro *TI99/4a*
Supplier *Stainless Software*
10 Alstone Road
Stockport
Cheshire SK4 5AH

MINED



SAS is the follow up to the very successful *Champions* on the Dragon 32

Although a more conventionally arcade style game than its predecessor, *SAS* has an elaborate series of instructions and a complex plot

You are the last survivor of a raiding party whose rescue copter has been shot down To rejoin your unit you have to cross nine minefields of increasing difficulty Helicopter gunships are searching for you and the minefields have patrolling armed guards

With the aid of a mine detector and a limited supply of grenades, you must cross the mines and get back to base

Program *SAS*
Price *£5 00*
Micro *Dragon 32*
Supplier *Peaksoft*
7 Hawthorn Crescent
Burton-on Trent

DATABASE

Despite it being (relatively) cheap, Commodore is still keen to promote the idea that the 64 is an effective business machine The promotion of this view may be aided by a sophisticated package from Audiogenic called *Magpie*

Magpie is a database that uses a series of overlapped menus to enable you to create records of up to 6 000 characters You can program a series of operations for *Magpie* to extract any given piece of information and then perform complex mathematical calculations upon it

The program, which is written in machine code is also compatible with *Wordcraft 64*

Program *Magpie*
Price *£99 95*
Micro *Commodore 64*
Supplier *Audiogenic*
PO Box 88
Reading

AT LAST, VALHALLA

After what seems like eons, *Valhalla* has arrived

Roughly a year ago, we saw the first reviews of *The Hobbit* — the game that has stayed at the top of almost everybody's list of the best Spectrum games Little wonder then that the first question everyone asks about *Valhalla* is "Is it as good as *The Hobbit?*" The answer is it all depends

For those who don't yet know it, *Valhalla* is an animated graphics adventure game with over 100 different locations and 36 characters all of whom have different personalities

At first glance, a comparison with *The Hobbit* looks useful As the program finishes *Loading*, after the excellent title screen, the computer draws an impressive castle in a picturesque setting — *Valhalla* — but you may not enter until you have completed six tasks

However, a few moments later you realise that something new is happening, objects appear closely followed by figures who wander around and talk to one another

Gradually, as you move around *Valhalla* you meet the entire cast and begin to recognise the different personalities and start to understand which characters are likely to help you achieve the first of your quests

There are no words or phrases to be guessed in *Valhalla*, the manual lists them all and the syntax editor won't let you enter anything which is not in its vocabulary Neither does *Valhalla* have the kind of logical puzzles that were the bane and pleasure of *Hobbit* players everywhere

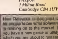
The only way to start to master *Valhalla* is to live in its world, talk to all the characters ask them questions, ask them for help just as they ask each other to do things and ask each other for help Gradually you can earn the respect of those influential characters like *Odin* and *Saga* who can help you find the more elusive objects

I spent a day with *Valhalla* and didn t even master the first quest, this is not just because I am an incompetent adventurer, it's simply that *Valhalla* is so ... watchable Just because you are doing nothing this is no reason for the other characters to interrupt their business Even if you start alone at a location, you will soon be joined by various goodies and baddies who will fight, eat, pick up objects, and talk

The problem with simply watching *Valhalla* is that you may forget to let your character eat and unless you eat you die Dying definitely loses you credibility amongst your friends, but it is not the end of the game Death in *Valhalla* simply transports you to a godforsaken wasteland in Hell where you start again, minus many of the useful objects you may have acquired.

Valhalla is really a different ball game from *The Hobbit* *Hobbit* could always be described as an adventure in the classic mainframe form except that it understood sophisticated sentences and had impressive graphics, the rules and puzzles were similar

Valhalla isn t like anything else Rather, I suspect it's the first attempt at something different — liveable movies Play it for yourself, I don't think you'll regret the £15



Program *Valhalla*
Price *£14 95*
Micro *Spectrum 48K*
Supplier *Legend*
Freepost
1 Milton Road
Cambridge CB4 1UY



New Releases is designed to let people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 12 13 Little Newport Street London WC2R 3LD.



Intelligence test?

Lately I have been considering what it is to be "intelligent" and what constitutes intelligent behaviour

The idea of trying to gauge what it is to be intelligent and how we could establish in what way an intelligent being would behave is symptomatic of our insecurity when faced with the thought of an intelligent machine

A typical test of intelligence was propounded by Alan Turing Turing's test of intelligent behaviour has now been used as the reason behind yet another book containing a collection of computer games I cannot remember too much about the book but I do remember that the games were given as an example of potential intelligence

At the time I thought that the book said more about the potential intelligence of the authors and their eye for the main chance, than about the possible intelligence of their games This book's authors thought that Turing and his test added some kudos to their efforts So what is his test?

At the simplest level you sit at a terminal The person at the other end is either male or female — purely by questioning you have to decide which he or she is Turing's test was could you tell whether the person at the other end was male female or realise that it was a computer?

A truly intelligent computer would be able to bluff its way and convince you that it was either male or female

An early attempt to try out something like this was Joseph Weisenbaum's *Eliza* program also called the *Doctor* program The nature of this program is well known — the computer is programmed to ask empty questions (ie questions which do not require any personal information) and not to give any answers

An empty question might be "What is your problem?" to which an answer might be "Computers" The program searches through the reply recognises the keyword *computers* and so answers "Do computers worry you?" Some people can get very carried away talking to *Eliza*

Weisenbaum tried out *Eliza* on his secretary She knew that it was only a program but after a while she turned to Weisenbaum and asked him to leave because the conversation was private This story is often used to show how even simple programs have some intelligence

But this argument fails totally If the feeling of personal empathy the secretary felt with the program is taken to indicate intelligence on the part of the program a child's doll is intelligent — the same empathy exists

Part of the human condition and a true measure of the creative intelligence of humanity is the ability to suspend belief and to become part of the action If intelligence consists of the ability of the non human agent to convince the human of its reality then the film *Love Story* is intelligent, given the reaction of cinema goers

Mechanical devices and computers far more than any other device capture the imagination of the human The human by use of his imagination can make the machine a real part of his world

The reaction of the secretary is no different to the mindless subservience of many (young and old) to video and computer games The desire to make the game live, or pour out one's heart to *Eliza* is the same mysticism which produced totemism in primitive societies

In some primitive societies, each grouping was known by the name of a living object — animal or vegetable — and in some cases the identification with that object made it into a religious item Are we beginning to treat computers in a similar way?

The bleary eyed child who worships his Spectrum does not prove the potential intelligence or otherwise of computers He proves that humanity is blessed (or damned) with a powerful imagination

The Turing test does not show intelligence it shows the ability of humans to transcend reality — just as the bleary-eyed child is actually fighting his way through the caverns and lairs ■

Boris Allan

Puzzle

A dicey proposition

Puzzle No 77

Artful 'arry, the confidence trickster was up before the magistrate again!

"But yer 'onour" pleaded Harry "I was only inviting punters to win a few bob in an 'onest wager"

"And how was the wager arranged?" queried the magistrate

"Well me lud let's say you puts down a quid an' then I puts down a quid Then you takes these 'ere four dice — and they are 'onest dice on me 'onour, your 'onour As I was sayin', you throws these four dice, an' we multiply together the numbers thrown Then we adds together the numbers in the answer — that's if there is more than one number — and if the answer 'ad more than one number still we keeps on addin' until only a single figure remains If this is even then you win the two quid if it's odd then you lose

"You see, your worship, it's an evens bet. Dead 'onest!"

Well, is it? How would you rate the odds?

Solution to Puzzle No 72

We know that the price of chips is less than 75p so the program assigns values from 1 to 75 to variable C and tests the other prices from the menu Then when a value is found that agrees with all the prices we have the correct answer

```
10 FOR C = 1 TO 75
20 LET S = 100 - C
30 LET E = 110 - S
40 LET B = 100 - E
50 LET T = 95 - B
60 IF T + C = 75 THEN PRINT "THE PRICE OF
   CHIPS IS";C
70 NEXT C
```

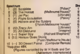
Once we have this value we can find out the prices of all the other items

The answers are chips 35p sausage 65p eggs 45p bacon 55p tomatoes 40p and chicken £1 30

Winner of Puzzle No 72

The winner is Mike Warren, Capell Avenue Chorleywood Herts, who receives £10

Top 10



Spectrum

1	(2)	Scrabble	(Psion)*
2	(3)	The Hobbit	(Melbourne House)*
3	(1)	Jet Pac	(Ultimate)
4	(4)	Flight Simulation	(Psion)*
5	(8)	Horace and the Spiders	(Psion/Melbourne House)*
6	(5)	Tranz Am	(Ultimate)
7	(6)	Ah Diddums	(Imagine)
8	(—)	Super Spy	(Richard Shepherd)*
9	(10)	Horace Goes Skiing	(Psion/Melbourne House)
10	(—)	3D Desert Patrol	(Computer Rentals)

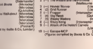
*Requires 48K

(Figures compiled by W H Smith and Son (Adventure International)‡

Dragon

1	(6)	Ring of Darkness	(Wintersoft)
2	(7)	Night Flight	(Salamander)
3	(4)	Taking Android Boots	(Microdeal)
4	(1)	Frogger	(Microdeal)
5	(—)	Mined Out	(Quicksilva)
6	(—)	Cuthbert Goes Walkabout	(Microdeal)
7	(3)	Shuttle	(Microdeal)
8	(2)	The King	(Microdeal)
9	(5)	Space War	(Microdeal)
10	(—)	Champions	(Peaksoft)

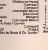
(Figures compiled by Gallo & Co, London)



Oric

1	(1)	Arcadia	(Imagine)
2	(—)	The Wizard and the Princess	(Melbourne House)
3	(—)	Hover Bovver	(Llamasoft)
4	(2)	Grid Runner	(Llamasoft)
5	(—)	Frogger	(Interceptor Micros)
6	(4)	Sky Hawk	(Quicksilva)
7	(3)	Wacky Waiters	(Imagine)
8	(—)	Krazy Kong	(Interceptor Micros)
9	(—)	Attack of the Mutant Camels	(Llamasoft)
10	(—)	Escape MCP	(Rabbit)

(Figures compiled by Boots & Co London)



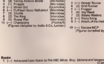


Atari

1	(1)	Miner 2049er	(Big Five)*
2	(7)	Panyan	(Datasoft)†§
3	(—)	Stone of Sisyphus	(Adventure International)‡
4	(6)	Arcade Machine	(Broderbund)‡
5	(8)	Combat Leader	(SSI)‡
6	(6)	Paris in Danger	(Avalon Hill)‡
7	(—)	Close Assault	(Avalon Hill)‡
8	(4)	Orc Attack	(Thorn EMI)*
9	(5)	Ultima II	(Sierra On line)‡
10	(—)	Empire of the Overmind	(Avalon Hill)†

*Cartridge †32K cassette ¶48K cassette §32K disc ‡48K disc

(Figures compiled by Calisto Computers, Birmingham 021-632 6458)



ZX81*

1	(1)	Flight Simulation	(Psion)
2	(6)	Space Raiders	(Psion)
3	(6)	Espionage Island	(Artic)
4	(—)	IK Games	(Artic)†
5	(—)	Fantasy Island	(Psion)
6	(3)	Defender	(Quicksilva)
7	(5)	QS Scramble	(Quicksilva)
8	(2)	Football Manager	(Addictive Games)
9	(4)	Ship of Doom	(Artic)
10	(—)	IK Chess	(Artic)†

All run in 16K except where shown

(Figures compiled by Stans & Co Lasbest)

Books

1	(—)	Advanced User Guide for the BBC Micro *Bray Dickens and Meisers*	(Cambridge Micro Centre)
2	(4)	Complete Spectrum Rom Disassembly *Logan and O'Hara*	(Melbourne House)
3	(2)	Commodore 64 Programmer's Reference Guide *Commodore*	(Commodore)
4	(3)	Advanced Graphics on the ZX Spectrum *Angell and Jones*	(Macmillan)
5	(—)	Z80 Assembly Language Subroutines *Leventhal*	(Osborne)
6	(1)	BBC Micro Book Basic, Sound and Graphics *McGregor and Watt*	(Addison-Wesley)
7	(8)	36 Challenging Games for the BBC Micro *Hartnell*	(Interface)
8	(—)	Spectrum Hardware Manual *Dickens*	(Melbourne House)
9	(—)	Supercharge Your Spectrum *Books*	(Melbourne House)
10	(9)	Programming the 6502, *Zaks*	(Sybex)

(Figures compiled by Watford Technical Books, Watford 0923 22324)

(Last week's position in brackets)

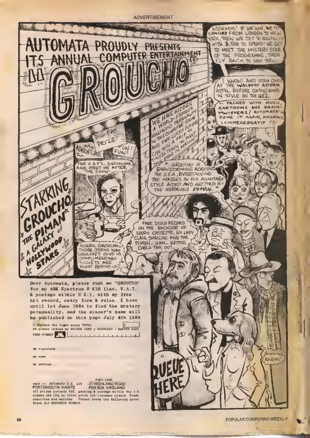


BBC*

1	(—)	Blagger	(Acornsoft)
2	(—)	Meteors	(Acornsoft)
3	(—)	Hopper	(Acornsoft)
4	(—)	Hopper	(Acornsoft)
5	(—)	Canyon	(BBC Soft)
6	(1)	White Knight	(BBC Soft)
7	(2)	3D Bonzo Alley	(Software Invasion)
8	(3)	Swarm	(Computer Concepts)
9	(—)	Pharaoh's Tomb	(A & F)
10	(—)	Demon Decorator	(Program Power)

*BBC Model B only

(Figures compiled by Seton Management, Ipswich 0473 58161)



Dear Automata, please rush me "GROUCHO" for my 48K Spectrum @ £10 (inc. V.A.T. & postage within U.K.), with my free hit record, entry form & rules. I have until 1st June 1984 to find the mystery personality, and the winner's name will be published on this page July 4th 1984

I enclose the right money TOTAL £

or please charge my ACCESS CARD / EUROCARD / MASTER CARD

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My Signature

my name

my address

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